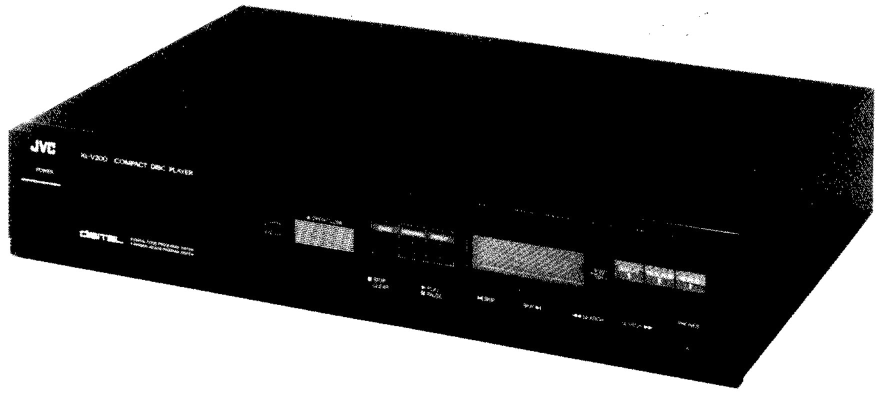
JVC

# SERVICE MANUAL

## COMPACT DISC PLAYER

## MODEL XL-V200B



COMPACT
disc
DIGITAL AUDIO

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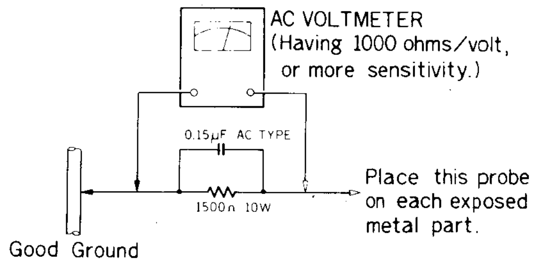
# Safety Precautions

1. The design of this product contains special hardware, many circuits and components specially for safety purposes.
   For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. Electrical components having such features are identified by shading on the schematics and by ( ⚠ ) on the parts list in Service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in Service manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and/or the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard.
   When servicing is required, the original lead routing and dress should be observed, and they should be confirmed to be returned to normal after re-assembling.
5. Leakage current check
   (Safety for electrical shock hazard)
   After re-assembling the product, always perform an isolation check on the exposed metal parts of the product (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.
   Do not use a line isolation transformer during this check.
   - Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good ground. Any leakage current must not exceed 0.5 mA AC (r.m.s.).
   - Alternate check method
     Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1500 Ω 10 W resistor paralleled by a 0.15 μF AC-type capacitor between an exposed metal part and a known good ground.
     Measure the AC voltage across the resistor with the AC voltmeter.
     Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).


AC VOLTMETER
(Having 1000 ohms/volt, or more sensitivity.)
0.15μF AC TYPE
1500Ω 10W
Place this probe on each exposed metal part.
Good Ground

**CHECKING YOUR LINE VOLTAGE (Except for U.S.A., Canada, Australia, U.K. and Continental Europe.)**
Before inserting the power plug, please check this setting to see that it corresponds with the line voltage in your area. If it doesn't, be sure to adjust the voltage selector switch to the proper setting before operating this equipment. The voltage selector switch is located on the bottom board.

**CAUTION** Before selecting the "Voltage selector switch" to proper voltage disconnect the power plug.

240V
120V
110V
220V

# Laser Caution

1. **CLASS 1 LASER PRODUCT**
2. **DANGER:** Invisible laser radiation when open and interlock failed or defeated. Avoid direct exposure to beam.
3. **CAUTION:** Do not open the top cover. There are no user serviceable parts inside the unit; leave all servicing to qualified service personnel.
4. **CAUTION:** The compact disc player uses invisible laser radiation and is equipped with safety switches which prevent emission of radiation when the drawer is open and the safety interlocks have failed or are defeated. It is dangerous to defeat the safety switches.
5. **CAUTION:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
6. **CAUTION:** The laser is able to function, if safety switches are out of function. The laser light is invisible, avoid exposure, do not disassemble the laser unit, but replace the complete unit.

---

**VARNING:** OSYNLIG LASERSTRÅLNING UPPSTÅR VID KOMPONENTENS ÖPPNING NÄR SÄKERHETSBRYTAREN ÄR FRÅNSLAGEN.

**VAROITUS:** VARMUUSKYTKIMEN OLLESSA POIS PÄÄLTÄ KUN LAITE AVATAAN, SIELLÄ KEHITTYY NÄKYMÄTÖNTÄ LASERSÄTEILYÄ. ÄLÄ PANE ITSEÄSI SÄTEILYN ALTIIKSI.

**ADVARSEL:** USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.

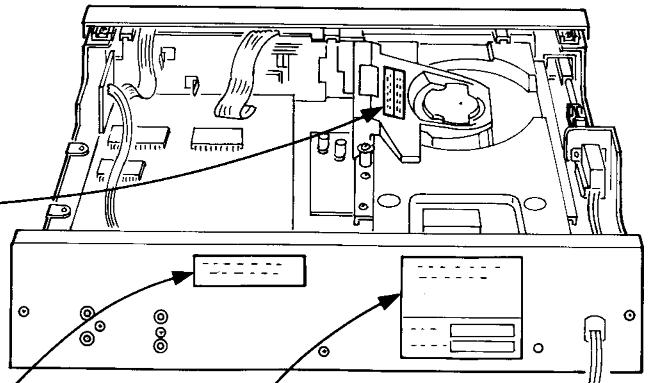
**ADVARSEL:** USYNLIG LASERSTRÅLING VED ÅPNING NÅR SIKKERHETSBRYTEREN ER AVSLOTT. UNNGÅ UTSETTELSE FOR STRÅLING.

(FOR U.S.A. ONLY)

LASER CAUTION LABEL

**DANGER – Invisible laser radiation when open and interlock failed or defeated.**
**AVOID DIRECT EXPOSURE TO BEAM**

(LABEL LOCATED INSIDE THE UNIT –DO NOT OPEN)



IDENTIFICATION LABEL

JVC MODEL NO. XL-V200B
COMPACT DISC PLAYER
AC 120 V ~ 60 Hz 12 W

US JVC CORP.
41 SLATER DRIVE ELMWOOD PARK,
N.J. 07407
MANUFACTURED AT Y.P.
MADE IN JAPAN

MANUFACTURED *1
SERIAL NO. *2

NOTE
(*1) : STAMP THE DATE OF MANUFACTURE
(*2) : STAMP THE SERIAL PRODUCTION NUMBER

CERTIFICATION LABEL

CERTIFICATION
THIS PRODUCT COMPLIES WITH DHHS RULES 21 CFR SUBCHAPTER J APPLICABLE AT DATE OF MANUFACTURE.

(PRINTED ON THE REAR PANEL)

# 1. Specifications

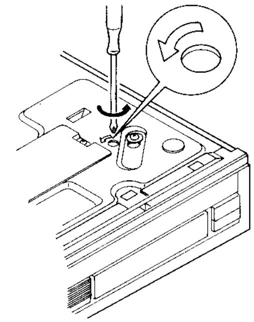
| | |
|---|---|
| System | : Compact disc player |
| Signal detection system | : Non-contact optical system pickup |
| Number of channels | : 2 channels |
| Frequncy response | : 5 Hz – 20,000 Hz |
| Dynamic range | : 95 dB (1 kHz) |
| Signal/noise ratio | : 93 dB |
| Channel separation | : 90 dB (1 kHz) |
| Total harmonic distortion | : 0.004 % |
| Wow and flutter | : Less than measurable limit |
| Output level | : 2.0 Vrms (full scale) |
| Numer of program steps | : 15 steps |
| Weight | : 3.8 kg (8.4 lbs.) |
| Dimensions | : 435(W) x 82(H) x 293(D) mm<br>(17-3/16″ x 3-1/4″ x 11-9/16″) |
| Accessory | : Signal cord . . . . . . . . . . 1<br>Remote cable (1 m) . . . . 1 |

**POWER SPECIFICATIONS**

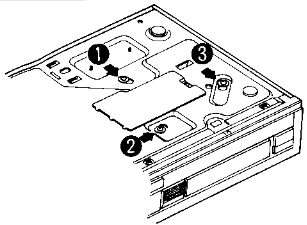
| Areas | Line Voltage & Frequency | Power Consumption |
|---|---|---|
| U.S.A. | AC 120 V∿, 60 Hz | 12 watts |
| Canada | | |
| Continental Europe | AC 220 V∿, 50 Hz | |
| U.K. | AC 240 V∿, 50 Hz | |
| Australia | | |
| Other areas | AC 110/120/220/240 V∿ selectable, 50/60 Hz | |

# 2. Before Use

1



2

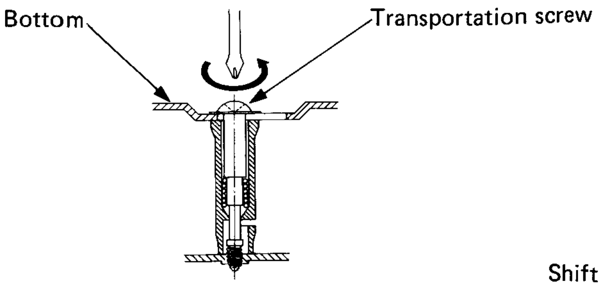


**Do not insert power plug to the receptacle until completion of all the preparations.**

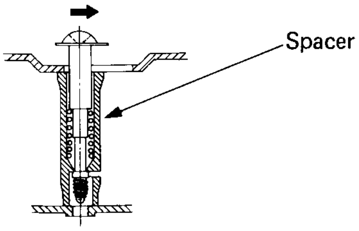
1. Insert + driver into the hole with arrow " ↶ " and turn if counter-clockwise to the end (turn about 180°) to remove the transportation lock for laser pick-up.
2. Remove transportation screw ❶ through ❸ with spacers.

**Note:**

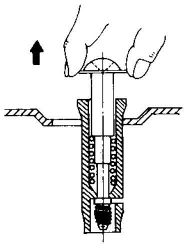
- **Be sure to keep the transportation screws.**
- **Be sure to prepare for shipment according to the procedures opposite to the above.**



Loosen the Transportaion screw



Shift the screw after it is away from the bottom.



Remove the screw

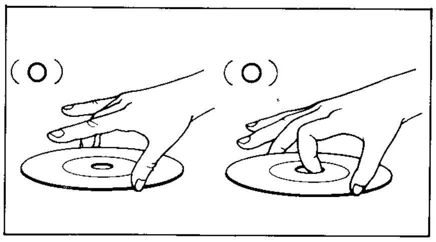
# 3. Precaution in Use

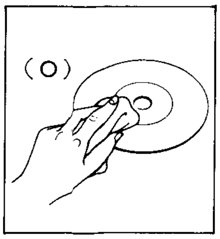
- **Installation**
- Select a place which is level, dry and **neither too cold nor too hot (between 5°C (41°F) and 35°C (95°F)).**
- Avoid a dusty place or a place subject to vibrations.
- **Power**
- When unplugging from the wall outlet, always pull the plug, not the power cord.
- **Malfunctions, etc.**
- Do not insert any metallic object inside the player.
- The discs to be played on this player are limited to those bearing the mark on the left.
- **Volume setting . . . .**
  As compact disc causes almost no noise, it is difficult to set the volume level by listening to noise as in the case of setting it for an ordinary analog turntable or a tape deck. If the volume level is raised too much because the beginning of the tune is quiet, the speakers may be damaged by a sudden increase of output.
- Placing something else other than a compact disc on the disc platter may cause the player to malfunction.
- If something goes wrong, turn the power off immediately. If the same phenomenon occurs when the power is turned on again, turn the power off and consult your JVC dealer.
- **Condensation . . . .**
  As the compact disc player uses optical parts, for example, a lens, etc., moving it from a cold to warm place or using it in a room subject to excessive humidity or in a room where the fire has just been lit may cause condensation on the optical parts. This phenomenon may prevent the light from being correctly transmitted, and may cause noise or malfunction.
  If dew condenses and the player does not function correctly, leave it for several hours with the power turned on.
  If the player does not function even after such a period, consult your dealer.

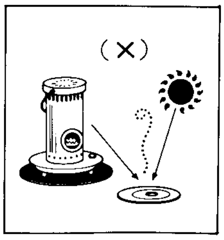
# 4. How to Handle a Compact Disc

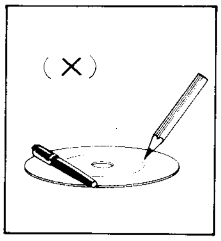
Since compact discs are plastic, they are easily damaged; if they get dirty, dusty, damaged or warped, the signal will not be picked up correctly, and such discs may cause the player to malfunction.
When using a compact disc, take care of the following points.

- Do not touch the surface to be played (reflective siver i.e. the side without the label) when playing or handling the discs.
- **Storage**
  Make sure to keep discs in their cases.
  If discs are piled on top of one another without cases, they may be damaged. Do not put discs in a place exposed to direct sunlight or in a place with high temperature and humidity.
  Especially, avoid leaving discs in your car.
- **Maintenance of discs**
  When fingerprints and dirt adhere to a disc, wipe off with a soft and dry cloth.
  If it is difficult to clean, wipe off with a cloth moistened with water.
- Do not use analog record cleaners, benzine, alcohol or antistatic agent.
- Do not damage the label side or stick paper or adhesive tape to it.









# 5. Index Points on Compact Disc

Certain compact discs have index points which help the location of movements or parts of symphonies, etc.
Set the tune number and index point from the jacket on which the index points are shown.

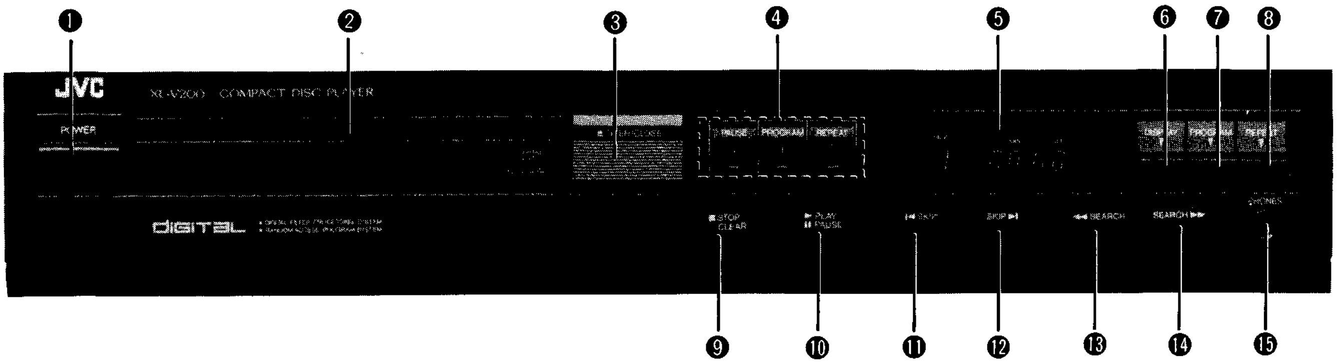
**(Example)**

- **Beethoven's fifth symphony in C minor, op. 67**

| T No.<br>(Tune number) | TRACK INFORMATION<br>(Contents) | TRK T. | A.T. | INDEX<br>(Number and contents) | |
|---|---|---|---|---|---|
| 1 | The first movement<br>Allegro con brio | 00:00<br>07:18 | 00:02<br>07:20 | 1. 1st Theme<br>2. 2nd Theme<br>3. Development<br>4. Recapitulation<br>5. Coda | 00 :00)<br>00 :46)<br>02 :50)<br>04 :11)<br>05 :46) |
| 2 | The second movement<br>Andante con moto | 00:00<br>09:38 | 07:23<br>17:01 | 1. 1st Theme<br>2. 2nd Theme<br>3. 1st Variation<br>4. 2nd Variation<br>5. 3rd Variation<br>6. Coda | 00 :00)<br>00 :55)<br>02 :03)<br>03 :55)<br>07 :08)<br>08 :60) |

(The rest is omitted.)

# 6. Description and Functions



① **POWER button**
Press to switch on the power; when the power is applied to this unit, the display shows "1 - - - -", which later becomes "0 00.00"
Press again to switch the POWER off, and the display goes off.

② **Disc platter**
Load the disc to be played.
**While the disc platter is moving, do not turn the power off or push the disc platter by hands etc.**

③ **OPEN/CLOSE ≜ button**
Press to move the disc platter in and out. Press once and the disc platter will move out; now load a disc and press again to move the platter back in. The disc is now ready to be played.
If it is pressed during play, play is interrupted, the program is erased from memory and the disc platter comes out.

④ **Indicators**
These indicators light up when pressing PAUSE, PROGRAM, and REPEAT buttons.

⑤ **Display**
This shows various program data including playing time, tune number, etc.

⑥ **DISPLAY button**
Each time this button is pressed, the display is changed in three modes; playing time of tune, index mode, remaining time of disc.

⑦ **PROGRAM button**
Press this button to program tunes.
The PROGRAM indicator lights when programming or playing back programmed tunes.

⑧ **REPEAT button**
Press for repeat play of all the tunes on a disc or the programmed tunes. Then the REPEAT indicator lights.
To release the repeat mode, press again and the indicator goes off.

⑨ **STOP ■ /CLEAR button**
Press to stop playing the disc or to erase programmed tunes.

⑩ **PLAY ▶ /PAUSE ❚❚ button**
Press this button to start play from the first tune or the programmed play after the loading of a disc is finished. Press this button again to suspend play temporarily; the PAUSE indicator lights. To restart playing, press this button again.

⑪ **SKIP ❙◀ button (backward)**
Press once during play to return the sensor to the start of the current tune. Press twice to return the sensor to the start of the previous tune. Each time it is pressed, the sensor moves backward by one tune. Keep pressing this button to return to the beginning of the previous tune.

⑫ **SKIP ▶❙ button (forward)**
Press once during play to move the sensor to the start of the next tune. Each time it is pressed, the sensor moves forward by one tune. Keep pressing this button to proceed to the beginning of the next tune.

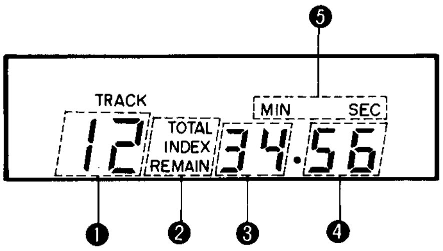
⑬ **SEARCH ◀◀ button (backward)**
Press to search for the required tune by moving the sensor back.

⑭ **SEARCH ▶▶ button (forward)**
Press to search for the required tune by moving the sensor forward; sound can be heard at reduced volume level while search is taking place in the play mode.

⑮ **PHONES**
Connect head-phone plug.

**Direct Call System**
Since this unit uses the Direct Call System, it is possible to play this unit just by pressing the CD/AUX button of the amplifier when this unit is connected to an amplifier incorporating a direct call system (consult your dealer) using the provided remote cable. Also it is possible to play this unit by pressing the PLAY ▶ / PAUSE ❚❚ button of this unit because the source switch of the amplifier is set automatically to CD/AUX.
**For more details of connecting to other units, refer to the amplifier's instruction book.**

**Notes:**
- **If a disc is not on the disc platter, play is not started even if the CD/AUX button of the amplifier is pressed.**
- **Since the CD player continues to operate even if the source select switch is changed, be sure to switch it off after you have finished listening to it.**



① The total number of tunes is displayed for about 3 seconds when a disc has been loaded and set for play. The number of the current tune is displayed when a disc is being played.

② TOTAL lights when a disc has been loaded or during programming.
Each time the DISPLAY button is pressed, INDEX then REMAIN lights.

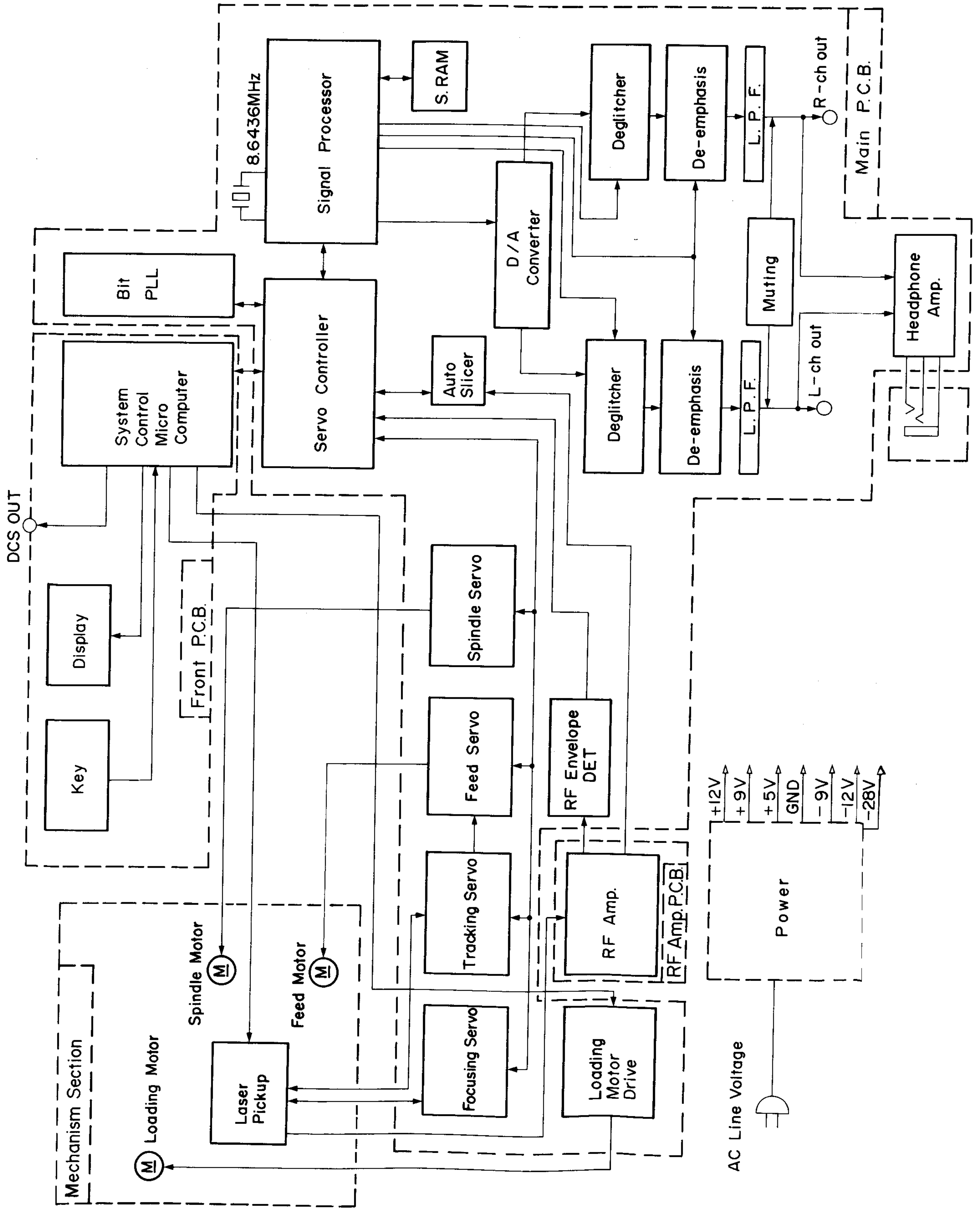
③ Shows the elapsed time or remaining time in minutes. It also shows the index of tune when index mode is selected.

④ Shows the elapsed time or remaining time of tune in seconds. When the index mode is selected, nothing is displayed.

⑤ Always lights except in index mode.

**Note:**
- **Do not indicate the performance time during pressing SKIP button " ❙◀ or ▶❙ " to search for the music.**

# 7. Schematic Block Diagram


8.6436MHz
Signal Processor
S. RAM
Deglitcher
De-emphasis
L. P. F.
R-ch out
Main P.C.B.
D/A Converter
Bit PLL
Servo Controller
Muting
Headphone Amp.
System Control Micro Computer
Auto Slicer
Deglitcher
De-emphasis
L. P. F.
L-ch out
DCS OUT
Display
Key
Front P.C.B.
Spindle Servo
Feed Servo
RF Envelope DET
+12V
+9V
+5V
GND
-9V
-12V
-28V
Power
Tracking Servo
RF Amp.
RF Amp. P.C.B.
Spindle Motor
M
Feed Motor
M
Mechanism Section
Loading Motor
M
Laser Pickup
Focusing Servo
Loading Motor Drive
AC Line Voltage

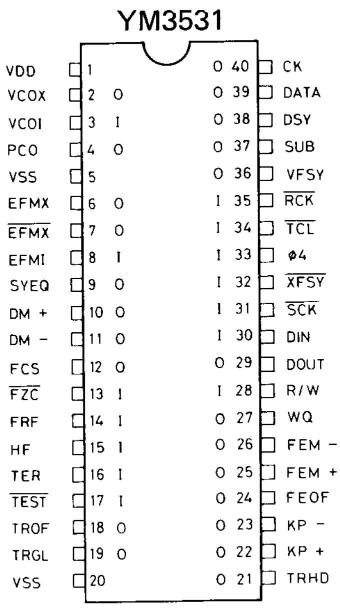
# 8. Description of Major LSI ICs

## 8-(1) YM3531(IC601)

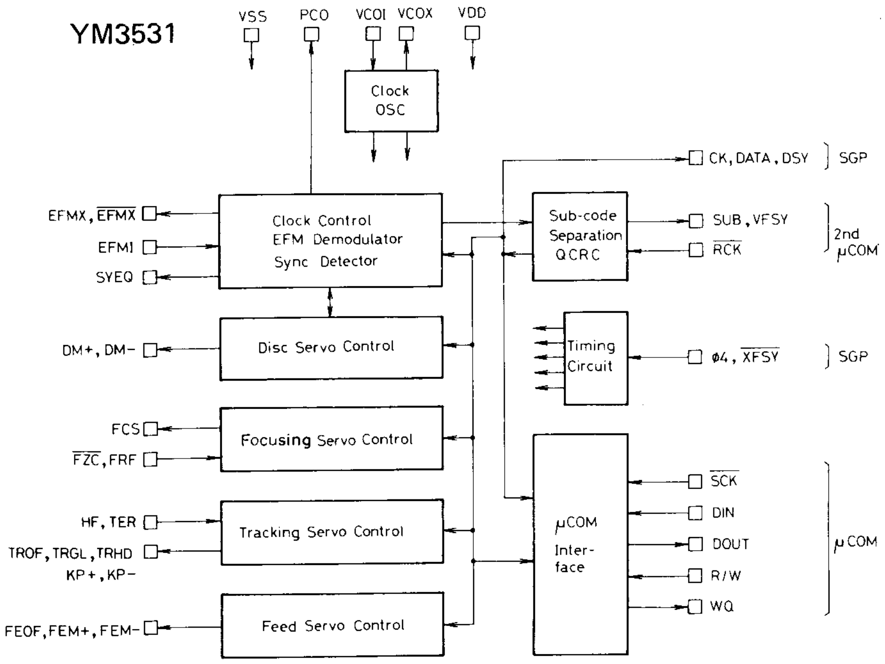
Outline: YM3531 is a silicon-gate CMOS LSI for CD player servo-control used with YM2201-K (SGP) for demodulation of EFM signal from photo pickup and various intelligent servo-control functions (focus, spindle, tracking, feed).

Function:
1) Digitizes EFM signal, performs clock regeneration and separates sync. signal.
2) EFM demodulates the digital signal described above and outputs it to YM2201-K (SGP).
3) Separates Q sub code from the digital signal described above and outputs it to the external microprocesser after CRC checking.
4) Outputs frame phase difference signal from regenerated and standard clocks and controls speed of spindle motor.
5) Performs tracking and feed motor servo-controls for music scanning and fast forward by input of commands from microprocessor.

**Terminal layout**


YM3531
VDD 1
VCOX 2 O
VCOI 3 I
PCO 4 O
VSS 5
EFMX 6 O
EFMX 7 O
EFMI 8 I
SYEQ 9 O
DM + 10 O
DM − 11 O
FCS 12 O
FZC 13 I
FRF 14 I
HF 15 I
TER 16 I
TEST 17 I
TROF 18 O
TRGL 19 O
VSS 20
O 40 CK
O 39 DATA
O 38 DSY
O 37 SUB
O 36 VFSY
I 35 RCK
I 34 TCL
I 33 φ4
I 32 XFSY
I 31 SCK
I 30 DIN
O 29 DOUT
I 28 R/W
O 27 WQ
O 26 FEM −
O 25 FEM +
O 24 FEOF
O 23 KP −
O 22 KP +
O 21 TRHD

**Block diagram**


YM3531
VSS
PCO
VCOI
VCOX
VDD
Clock OSC
CK, DATA, DSY
SGP
EFMX, EFMX
EFMI
SYEQ
Clock Control
EFM Demodulator
Sync Detector
Sub-code Separation QCRC
SUB, VFSY
RCK
2nd μCOM
DM+, DM−
Disc Servo Control
Timing Circuit
φ4, XFSY
SGP
FCS
FZC, FRF
Focusing Servo Control
HF, TER
TROF, TRGL, TRHD
KP+, KP−
Tracking Servo Control
μCOM Inter-face
SCK
DIN
DOUT
R/W
WQ
μCOM
FEOF, FEM+, FEM−
Feed Servo Control

Description of terminal functions

1) EFM signal external circuit ⑧EFMI, ⑦$\overline{\text{EFMX}}$, ⑥EFMX
Inputs signal with optimum level (1 − 2 Vpp) from photo pickup to EFMI terminal and mutually opposite phase signal with limited amplitude is generated from $\overline{\text{EFMX}}$ and EFMX. Controls slice level.

2) Clock regeneration circuit ④PCO, ③VCOI, ②VCOX
Performes clock oscillation (8.6436 MHz on average) when LC resonance circuit is connected between VCOI and VCOX. Output from PCO terminal is phase difference output at polarity change of clock and EFM pattern and can regenerate clock by setting the polarity of variable capacity diode so that the frequency is increased when positive.

3) Synchronization coincidence signal ⑨SYEQ
Output terminal for checking; becomes "H" when synchronizing signal detected from EFM pattern and that of internal counter are coincident.

4) Signal to SGP ㊵ CK, ㊴ DATA, ㊳ DSY
CK is clock of 4.3218 MHz on average and the frequency of the VCO is divided by two. DATA is serial signal with bit rate of this clock and contains 8-bit EFM demodulation signal and 5-bit data control signal. DSY is synchronizing signal which becomes "H" with timing coinciding with the first signal.
These three signals are connected to SGP.

5) Sub code output ㊲ SUB, ㊱ VFSY, ㉟ $\overline{\text{RCK}}$
VFSY is synchronizing output combining frame and sub code frame (98-frame). By determining the change from "H" to "L" of this signal externally and sending clock 8 times to RCK terminal, it is possible to take out sub code P − W from SUB output terminal in serial bits.

6) Signal from SGP ㉝ φ4, ㉜ XFSY
Input terminal to be connected to SGP. φ4 is a 4.3128 MHz crystal clock and XFSY is a 7.35 kHz frame synchronizing signal.

7) Q code output ㉗ WQ, ㉘ R/W, ㉙ DOUT, ㉛ $\overline{\text{SCK}}$

**Detail of DOUT**

| Internal state | |
|---|---|
| CONT | ADR |
| TNO<br>INDEX<br>MIN<br>SEC<br>FRAME<br>P-CODE<br>AMIN<br>ASEC<br>AFRAME | |

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| SIGN | S2 | S1 | 8F | 4F | MZ | FCO | NQ |

SIGN: Search polarity
S2, S1: Search mode
8F, 4F: Frame error
MZ: Disc motor stops
FCO: Focus out
NQ: New Q code

It is possible to take out the above data to DOUT in bit serial by detecting "H" of WQ by μCOM and sending $\overline{\text{SCK}}$.
This finishes by setting R/W once to "H" after sending out $\overline{\text{SCK}}$ clock.

8) μCOM command ㉘ R/W, ㉚ DIN, ㉛ $\overline{\text{SCK}}$

**Detail of DIN**

| Command |
|---|
| μMIN<br>μSEC<br>μFRAME |

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| M4 | M3 | M2 | M1 | T4 | T3 | T2 | T1 |
| Instruction | | | | Test | | | |

The above data is input by synchronizing and sending out $\overline{\text{SCK}}$ clock and DIN after setting R/W to "H" by μCOM. For instruction except for 7, 1 byte is input and when it is 7, 4 bytes are input.

9) Focusing servo Input: ⑬ $\overline{\text{FZC}}$, ⑭ FRF, Output: ⑫ FCS
These terminals are used for input of focusing servo. FCS signal is a signal to input focus. When focusing point has been reached, the lead-in function stops if $\overline{\text{FZC}}$ signal is generated and the FCO flag is disabled internally by the FRF signal having detected the reflected ray.

10) Disc servo ⑩ DM+, ⑪ DM−
DM+ and DM− are PWM output of one frame (7.35 kHz) cycle. DM+ and DM− cannot be set to "H" at the same time. In stable conditions during PLAY, they have the resolving-power of 1/47 of one frame i.e. 9.25 ns.

11) Tracking servo Input: ⑮ HF, ⑯ TER
Output: ⑱ TROF, ⑲ TRGL, ㉑ TRHD, ㉒ KP+, ㉓ KP−
Samples the change of amplitude of HF signal generated when traversing the track during search at the zero cross point of tracking error signal TER and outputs TROF signal. Correction of track becomes easy because servo is switched on and off by the change of the signal level. Outputs TRHD while outputting KP+ and KP− for tracking and holds tracking error signal.

12) Feed servo ㉔ FEOF, ㉕ FEM+, ㉖ FEM−
FEM+ or FEM− signal is output as the high-speed feed signal. During this time, FEOF signal is output to cut the feed servo.

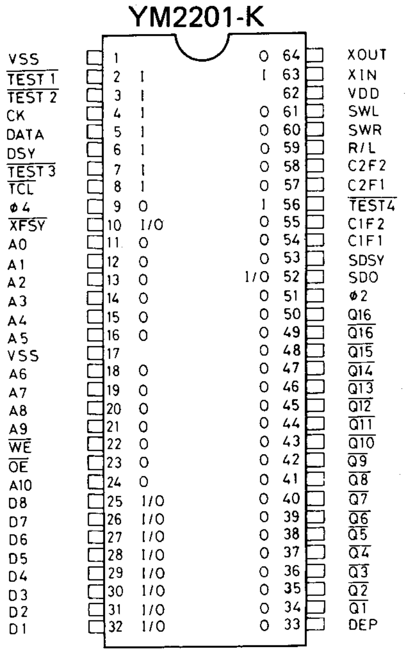
13) Test terminal ⑰ TEST, ㉞ TCL
Terminal for testing which is normally "H" by internal pull-up resistor. Not connected.

### 8-(2) YM2201-K (IC502)

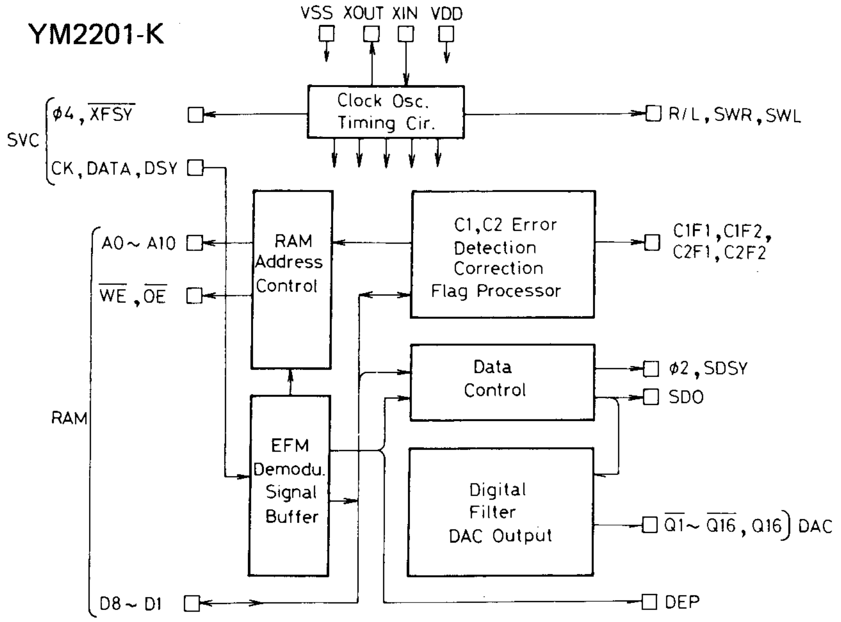
Outline: YM2201-K (SGP) is N channel silicon gate MOS LSI for signal processor in CD player.
Performs digital filtering for correction of digital signal and improvement of sound quality; used with YM3531 (SVC).

Function:
1) Generates standard clock oscillations and timing signals necessary for operation with external crystal oscillator.
2) Performs buffering of EFM demodulation signal for absorbing fluctuation in disc speed and exchanges signals with external RAM.
3) Unscrambles and deinterleaves by re-sequencing digital signal from YM3531 (SVC) into a fixed sequence.
4) Performs the detection and correction of error signals and flag processing (double error correction system).
5) Performs signal interpolation, pre-hold and muting etc.
6) Performs digital filtering (signal cutoff at 20 kHz) by doubling the sampling cycle for each channel L and R to 882 kHz and outputs signal for DAC.

**Terminal layout**


YM2201-K
VSS 1
$\overline{TEST1}$ 2 I
$\overline{TEST2}$ 3 I
CK 4 I
DATA 5 I
DSY 6 I
$\overline{TEST3}$ 7 I
$\overline{TCL}$ 8 I
ϕ4 9 O
$\overline{XFSY}$ 10 I/O
A0 11 O
A1 12 O
A2 13 O
A3 14 O
A4 15 O
A5 16 O
VSS 17
A6 18 O
A7 19 O
A8 20 O
A9 21 O
$\overline{WE}$ 22 O
$\overline{OE}$ 23 O
A10 24 O
D8 25 I/O
D7 26 I/O
D6 27 I/O
D5 28 I/O
D4 29 I/O
D3 30 I/O
D2 31 I/O
D1 32 I/O
O 64 XOUT
I 63 XIN
62 VDD
O 61 SWL
O 60 SWR
O 59 R/L
O 58 C2F2
O 57 C2F1
I 56 $\overline{TEST4}$
O 55 C1F2
O 54 C1F1
O 53 SDSY
I/O 52 SDO
O 51 ϕ2
O 50 Q16
O 49 $\overline{Q16}$
O 48 $\overline{Q15}$
O 47 $\overline{Q14}$
O 46 $\overline{Q13}$
O 45 $\overline{Q12}$
O 44 $\overline{Q11}$
O 43 $\overline{Q10}$
O 42 $\overline{Q9}$
O 41 $\overline{Q8}$
O 40 $\overline{Q7}$
O 39 $\overline{Q6}$
O 38 $\overline{Q5}$
O 37 $\overline{Q4}$
O 36 $\overline{Q3}$
O 35 $\overline{Q2}$
O 34 $\overline{Q1}$
O 33 DEP

**Block diagram**


YM2201-K
VSS XOUT XIN VDD
Clock Osc. Timing Cir.
R/L, SWR, SWL
SVC
ϕ4, $\overline{XFSY}$
CK, DATA, DSY
RAM
A0 ~ A10
$\overline{WE}$, $\overline{OE}$
D8 ~ D1
RAM Address Control
C1, C2 Error Detection Correction Flag Processor
C1F1, C1F2, C2F1, C2F2
Data Control
ϕ2, SDSY
SDO
EFM Demodu. Signal Buffer
Digital Filter DAC Output
$\overline{Q1}$ ~ $\overline{Q16}$, Q16 DAC
DEP

Description of terminal functions

1) Clock oscillation (63) XIN, (64) XOUT
Performs oscillation by connecting 10 pF capacitor between GND terminals and crystal oscillator (8.6436 MHz) between terminals.

2) Synchronizing signal to SVC ⑨ ϕ4, ⑩ $\overline{XFSY}$
Outputs clock of 4.3218 MHz and synchronizing signal of 7.35 kHz to SVC.

3) Signal from SVC ④ CK, ⑤ DATA, ⑥ DSY
Connect to the SVC output. They are the VCO clock (4.3218 MHz on avarage), EFM demodulation + data control signal and synchronizing signal.

4) RAM connection ⑪ AO – ㉔ A10, ㉒ $\overline{WE}$, ㉓ $\overline{OE}$, ㉕ D8 - ㉜ D1
They are respectively address, input/output control signal and data signal to be connected to the RAM terminals.
SGP is in output configuration with $\overline{WE}$="L" and in input configuration with $\overline{WE}$="H".

5) C1 and C2 error correction check signals (54) C1F1, (55) C1F2, (57) C2F1 and (58) C2F2
Terminals for checking to determine the function conditions of C1 and C2 error correction circuits.

| C1/C2 | F2 | F1 |
|---|---|---|
| No error | 0 | 0 |
| One error | 0 | 1 |
| Double error | 1 | 0 |
| Impossible to correct | 1 | 1 |

6) Data control circuit: serial signal output (51) ϕ2, (52) SDO, (53) SDSY, (56) $\overline{TEST4}$
ϕ2 is 2.1609 MHz crystal clock.
SDO is serial output signal, LCH 24-bit, RCH 25-bit and LSB for DAC at ϕ2 bit rate.
When $\overline{TEST4}$ is normally "H", SDO is in output condition. When it is set to "L", input to the digital filter is possible using the same format.
$\overline{SDSY}$ is synchronizing signal and when SDO is LCH, it is "H"; it is "L" for RCH.

7) Parallel DAC output signals ㉞ $\overline{Q1}$ – ㊾ $\overline{Q16}$, ㊿ Q16, (59) R/L, (60) SWR, (61) SWL
Parallel output signals for DAC. Data rate is 88.2 kHz for each channel after signals have been digitally filtered, (band suppression of 44.1 ±20 kHz), LCH and RCH in order.
It is possible to conform to two's complement DAC by using $\overline{Q16}$ and to DAC of offset binary by using Q16. R/L is a signal for distribution of DAC analog outputs; when "H" is RCH, SWR, SWL are signals for deglitching each channel.

8) De-emphasis signal ㉝ DEP
De-emphasis is necessary when the frequency characteristic control signal is "H".

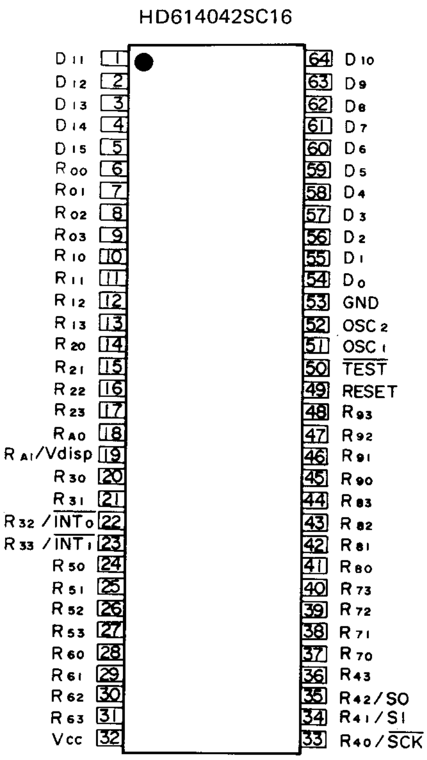
9) Test terminals ② $\overline{TEST1}$, ③ $\overline{TEST2}$, ⑦ $\overline{TEST3}$, ⑧ $\overline{TCL}$
Terminals for tests which are normally "H" by internal pull-up resistors. Not connected.

### 8-(3) HD614042SC16(IC301)

Outline: This IC is C-MOS 4-bit single chip microprocessor with 4096 word x 10-bit ROM, 256 digit x 4-bit RAM, In/Out, Timer/Counter and Serial Interface.

The main functions of IC command the operation to FL display, LED display, servo control, mechanism control, etc. and accept the signal from operation switches.

**Terminal layout**

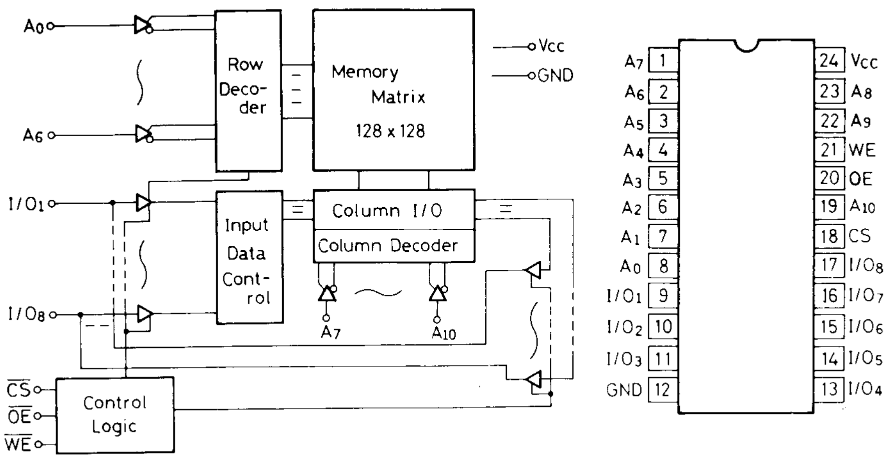

HD614042SC16
D11
D12
D13
D14
D15
R00
R01
R02
R03
R10
R11
R12
R13
R20
R21
R22
R23
RA0
RA1/Vdisp
R30
R31
R32 /INT0
R33 /INT1
R50
R51
R52
R53
R60
R61
R62
R63
Vcc
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
64
63
62
61
60
59
58
57
56
55
54
53
52
51
50
49
48
47
46
45
44
43
42
41
40
39
38
37
36
35
34
33
D10
D9
D8
D7
D6
D5
D4
D3
D2
D1
D0
GND
OSC2
OSC1
TEST
RESET
R93
R92
R91
R90
R83
R82
R81
R80
R73
R72
R71
R70
R43
R42/SO
R41/SI
R40/SCK

**Terminal and function**

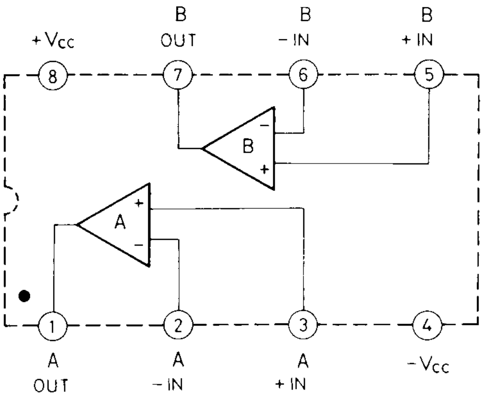
| Pin No. | Pin Name | Function | Activ. |
|---|---|---|---|
| 1 | D11 | Digit 2 | H |
| 2 | D12 | Digit 3 | H |
| 3 | D13 | Digit 4 | H |
| 4 | D14 | Digit 5 | H |
| 5 | D15 | Digit 6 | H |
| 6 | R00 | Segment h | H |
| 7 | R01 | – | H |
| 8 | R02 | Close (–) | H |
| 9 | R03 | Open (+) | H |
| 10 | R11 | Segment a | H |
| 11 | R12 | Segment b | H |
| 12 | R13 | Segment c | H |
| 13 | R14 | Segment d | H |
| 14 | R20 | Segment e | H |
| 15 | R21 | Segment f | H |
| 16 | R22 | Segment g | H |
| 17 | R23 | – | – |
| 18 | RA0 | – | – |
| 19 | RA1 | Vdisp | – |
| 20 | R30 | REC. INH. | – |
| 21 | R31 | – | – |
| 22 | R32 | $\overline{\text{LASER ON}}$ | L |
| 23 | R33 | – | – |
| 24 | R50 | SW open | L |
| 25 | R51 | SW close | L |
| 26 | R52 | SW rest | L |
| 27 | R53 | (SW T. Play) | L |
| 28 | R60 | – | – |
| 29 | R61 | – | – |
| 30 | R62 | – | – |
| 31 | R63 | – | – |
| 32 | Vcc | +5V | – |
| 33 | R40 | $\overline{\text{SCK}}$ | L |
| 34 | R41 | DOUT | H |
| 35 | R42 | DIN | H |
| 36 | R43 | R/W | – |
| 37 | R70 | – | – |
| 38 | R71 | – | – |
| 39 | R72 | (GRAPH CLR) | – |
| 40 | R73 | (GRAPH HLD) | – |
| 41 | R80 | KEY 00 } OUT | H |
| 42 | R81 | KEY 00 | H |
| 43 | R82 | KEY 02 | H |
| 44 | R83 | KEY 03 | H |
| 45 | R90 | KEY 10 } IN | H |
| 46 | R91 | KEY 11 | H |
| 47 | R92 | KEY 12 | H |
| 48 | R93 | KEY 13 | H |
| 49 | RESET | RESET | – |
| 50 | $\overline{\text{TEST}}$ | $\overline{\text{TEST}}$ | – |
| 51 | X1 | CK | – |
| 52 | X2 | – | – |
| 53 | GND | GND | – |
| 54 | D0 | WQ | H |
| 55 | D1 | DM- | H |
| 56 | D2 | DCS IN | – |
| 57 | D3 | DCS OUT | – |
| 58 | D4 | – | – |
| 59 | D5 | REP (LED) | H |
| 60 | D6 | PROG (LED) | H |
| 61 | D7 | PAUSE (LED) | H |
| 62 | D8 | [PLAY (LED)] | [H] |
| 63 | D9 | Digit 0 | H |
| 64 | D10 | Digit 1 | H |

# 9. Other LSI ICs and Internal Block Diagrams of ICs

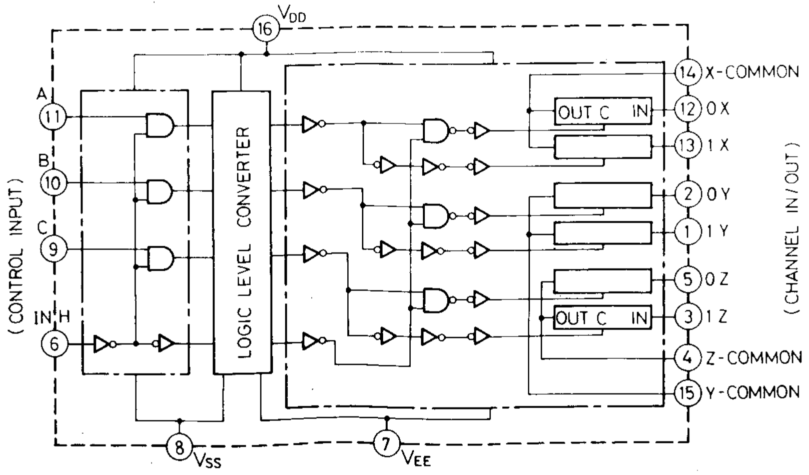
**■ μPD446C-2 (High Speed Static C-MOS RAM)**


A0
A6
I/O1
I/O8
CS
OE
WE
Row Decoder
Memory Matrix 128 x 128
Vcc
GND
Input Data Control
Column I/O
Column Decoder
A7
A10
Control Logic
A7 1
A6 2
A5 3
A4 4
A3 5
A2 6
A1 7
A0 8
I/O1 9
I/O2 10
I/O3 11
GND 12
24 Vcc
23 A8
22 A9
21 WE
20 OE
19 A10
18 CS
17 I/O8
16 I/O7
15 I/O6
14 I/O5
13 I/O4

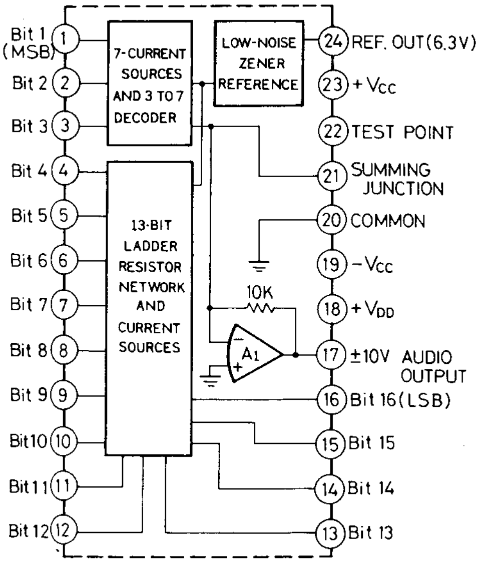
**■ M5219P**
**■ NJM072D/NJM4560D-D (OP Amp.)**


+Vcc
B OUT
B −IN
B +IN
8
7
6
5
B
A
1
2
3
4
A OUT
A −IN
A +IN
−Vcc

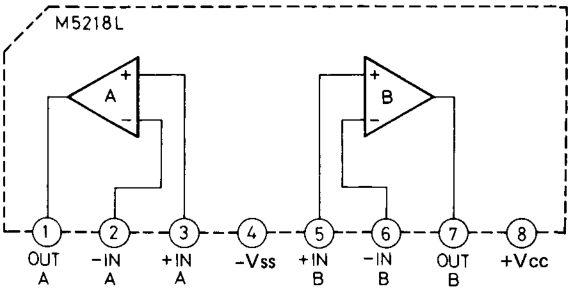
**■ BU4053B (Analog Switch)**


VDD
16
A 11
B 10
C 9
INH 6
(CONTROL INPUT)
LOGIC LEVEL CONVERTER
OUT C IN
14 X-COMMON
12 0X
13 1X
2 0Y
1 1Y
5 0Z
3 1Z
4 Z-COMMON
15 Y-COMMON
(CHANNEL IN/OUT)
8 VSS
7 VEE

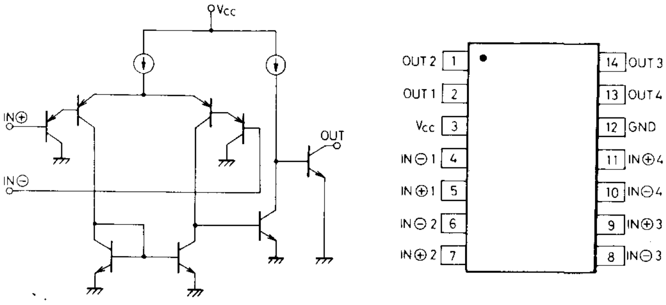
## ■ PCM53JP-V-2 (D/A Converter)


Bit 1 (MSB)
Bit 2
Bit 3
Bit 4
Bit 5
Bit 6
Bit 7
Bit 8
Bit 9
Bit10
Bit11
Bit12
7-CURRENT SOURCES AND 3 TO 7 DECODER
LOW-NOISE ZENER REFERENCE
13-BIT LADDER RESISTOR NETWORK AND CURRENT SOURCES
10K
A1
24 REF. OUT(6.3V)
23 +Vcc
22 TEST POINT
21 SUMMING JUNCTION
20 COMMON
19 −Vcc
18 +VDD
17 ±10V AUDIO OUTPUT
16 Bit 16(LSB)
15 Bit 15
14 Bit 14
13 Bit 13

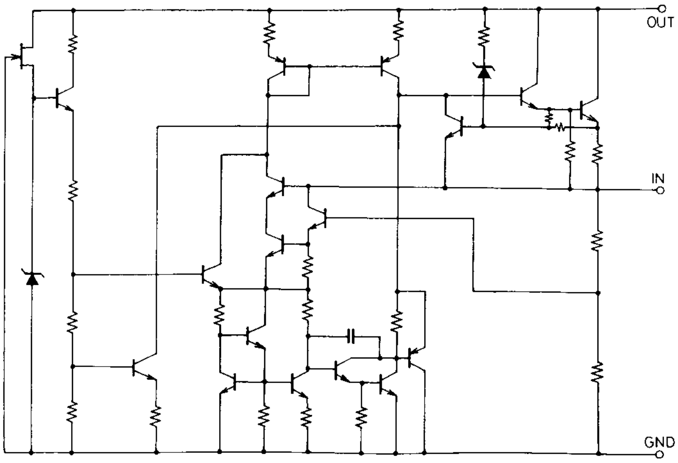
## ■ M5218L (OP Amp.)


M5218L
A
B
1 OUT A
2 −IN A
3 +IN A
4 −Vss
5 +IN B
6 −IN B
7 OUT B
8 +Vcc

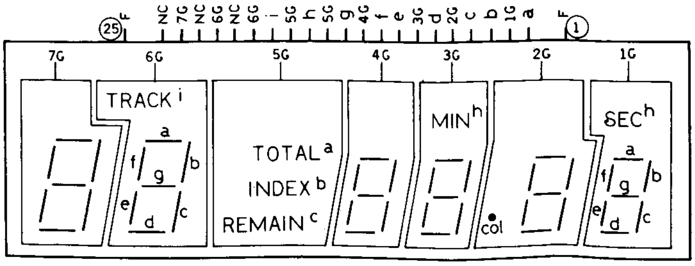
## ■ NJM2901N (Comparator)


Vcc
IN⊕
IN⊖
OUT
OUT 2 1
OUT 1 2
Vcc 3
IN⊖1 4
IN⊕1 5
IN⊖2 6
IN⊕2 7
14 OUT 3
13 OUT 4
12 GND
11 IN⊕4
10 IN⊖4
9 IN⊕3
8 IN⊖3

## ■ NJM78M05A (Regulator)



## ■ ELU0001-025 (FL Display Tube)


25
F
NC
7G
NC
6G
NC
6G
i
5G
h
5G
g
4G
f
e
3G
d
2G
c
b
1G
a
F
1
7G
6G
5G
4G
3G
2G
1G
TRACK i
a
f
g
b
e
d
c
TOTAL a
INDEX b
REMAIN c
MIN h
col
SEC h

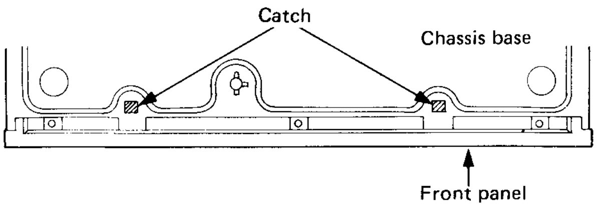
# 10. Disassembly Procedures

### 10-(1) Removal of metal cover

1. Remove the six securing screws.
2. Extract the metal cover by pulling it aslant and upward to the rear, while slightly lifting it.
3. When difficult to demount, removal can be facilitated by lightly pushing up the metal cover at its front side from its rear.

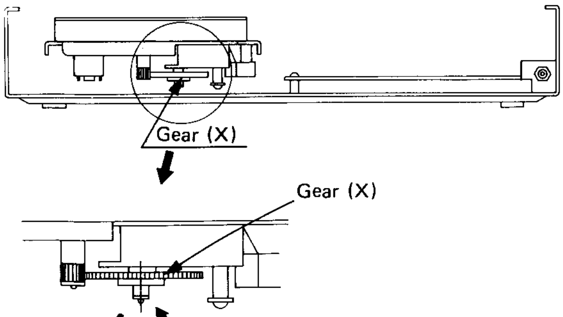
### 10-(2) Removal of front panel

1. Remove the three securing screws (from the bottom side).
2. Remove the two plastic rivets (from the upper side).
3. The front panel can be detached by pulling it to the front while pushing up the two catches (shown in the figure below).

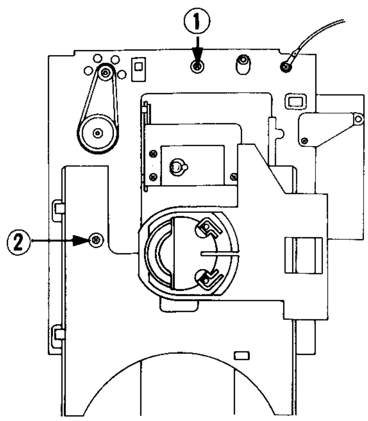


### 10-(3) Removal of mechanical assembly

1. Detach the front panel.
2. Extract the tray by manually rotating clockwise the gear (X) (shown in the figure below).

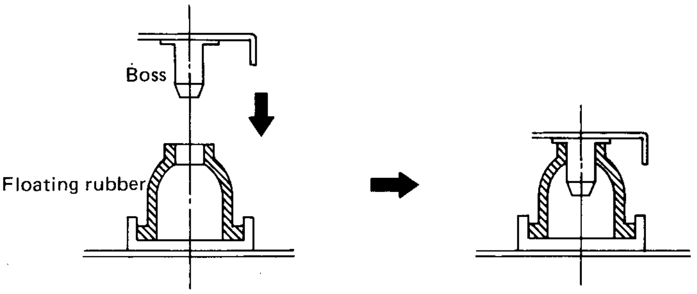


3. Remove screws ① and ② (shown in the figure below).



4. Replace the tray assembly to its original position and lift upright the mechanical assembly.

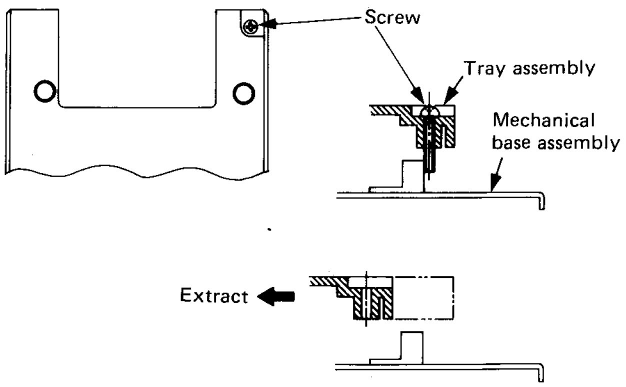
**Note:** When reinstalling the mechanical assembly, confirm that the four bosses (shown in the figure below) on its rear side are correctly inserted into the floating rubber of the chassis (shown in the figure below).



(Correctly inserted status)

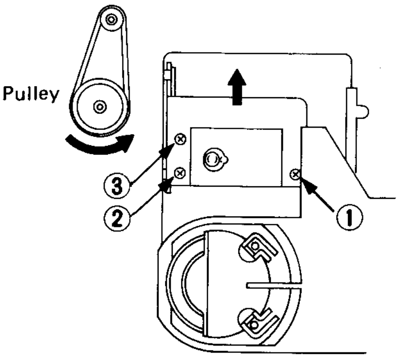
### 10-(4) Removal of tray assembly

Remove the stopper screw (shown in the figure below) and extract the tray assembly to the front.



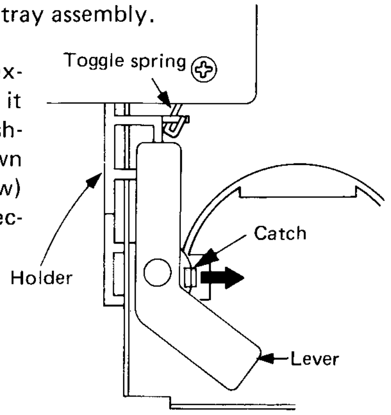
### 10-(5) Removal of laser pickup

Rotate the pulley (shown in the figure below) counterclockwise to cause the laser pickup to be shifted to the external side. The laser pickup can be demounted by removing three screws ① ~ ③ (shown in the figure below).

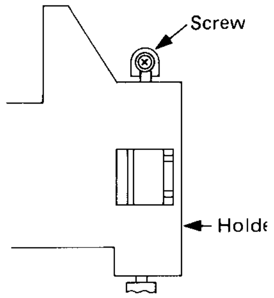


### 10-(6) Removal of spindle motor

1. First demount the tray assembly.
2. Detach the lever.
   The lever can be extracted by pulling it upward while pushing the catch (shown in the figure below) in the arrow direction.

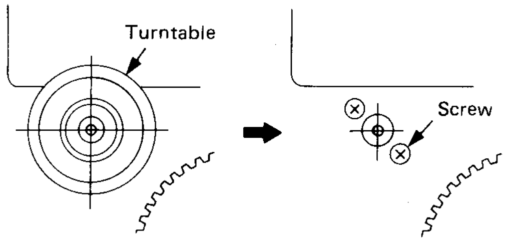


3. Detach the holder by removing the screw.



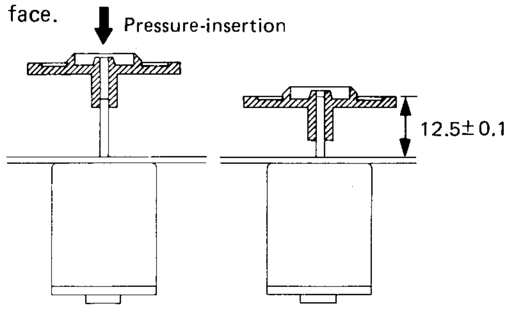
**Note**: After the holder has been reinstalled, correctly replace the toggle spring (shown in the figure under 10-(6)-2).

4. Extract the turntable and remove the two screws.

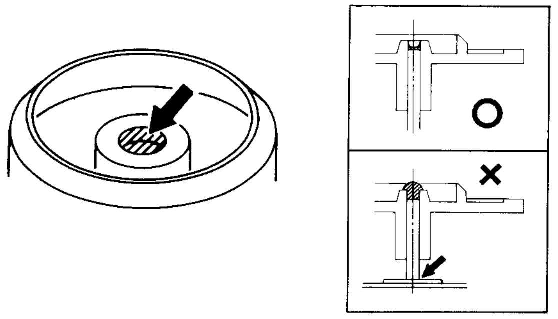


**Note**: Installation of spindle motor

1. Replace the two screws by applying uniform tightening torque.
2. Pressure-insert the turntable. Straight insertion must be made while supporting the motor at its lowest section, and accurate alignment must be achieved to obtain its height of 12.5 mm ± 0.1 mm from the mechanical base top surface.



3. After pressure-insertion is made, bond the motor shaft and turntable together (arrow-mark section on the left-hand figure below). Use the bonding agent of "LOCTITE #460" while limiting the applied volume to a minimum. Exercise care not to cause surplus bonding agent to pile up on the turntable, as shown in the lower-side figure. Absolutely avoid causing the bonding agent to attach to the motor bearings (arrow-mark section on the right-hand figure above).



# 11. Application Points for Grease and Adhesive

**Grease (Refer to next page.)**

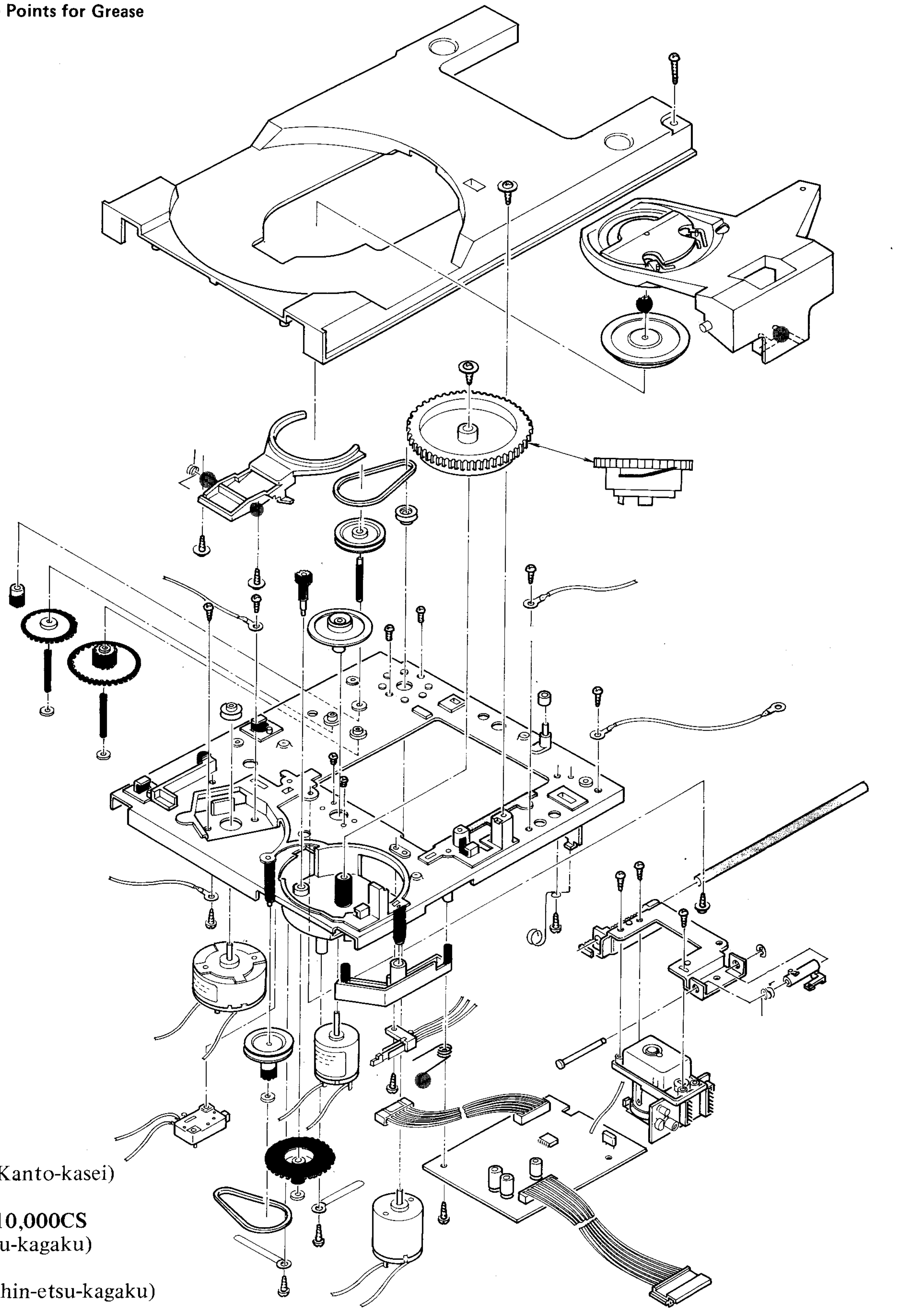
| Item | Points to apply grease |
|---|---|
| KF96H; 10,000 CS<br>(Shin-etsu-kagaku) | ● Engagement portion of Holder ass'y and Toggle spring. |
| G-501<br>(Shin-etsu-kagaku) | ● Fitting portion of feed shaft and bushing.<br>● Sliding portion of right edge of PU base and upper side of mechanism base. |
| G311S<br>(Kanto-kasei) | ● Gear engagement portion.<br>● Engagement portion of tray and mechanism base.<br>● Top of cam on the under side of main gear in loading section.<br>● Boss of Lever.<br>● Lever portion of mechanical base.<br>● Spindle portions of gears and pulleys. |

**Adhesive**

| Item | Points to apply adhesive |
|---|---|
| LOCTITE #460 | ● Joining the spindle motor shaft and turntable together. |

**Note:** If the specified greases and adhesives are not available, consult your nearest JVC dealer.

### 11-(1) Application Points for Grease



■ G311S (Kanto-kasei)

▨ KF96H 10,000CS (Shin-etsu-kagaku)

☐ G-501 (Shin-etsu-kagaku)

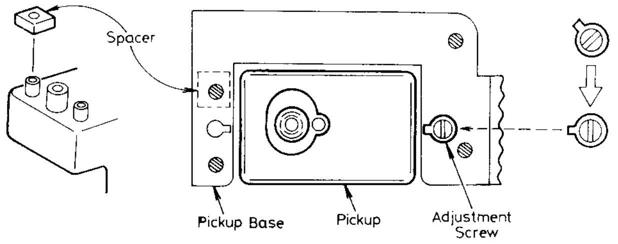
# 12. Maintainance of Laser Pickup

**12-(1) Service life of the laser diode**

1. Connect the IC301 pin ㉒ of Front PCB (ENN-020-2) to GND, and turn the power switch ON. Then measure the laser radiation power with the laser power meter. If the indication is obtained less than 0.35mW, then the service life of the laser diode should be judged as having expired.
2. When the EFM output is extremely low, that cannot focus enough, the service life of the laser diode should be judged as having expired.

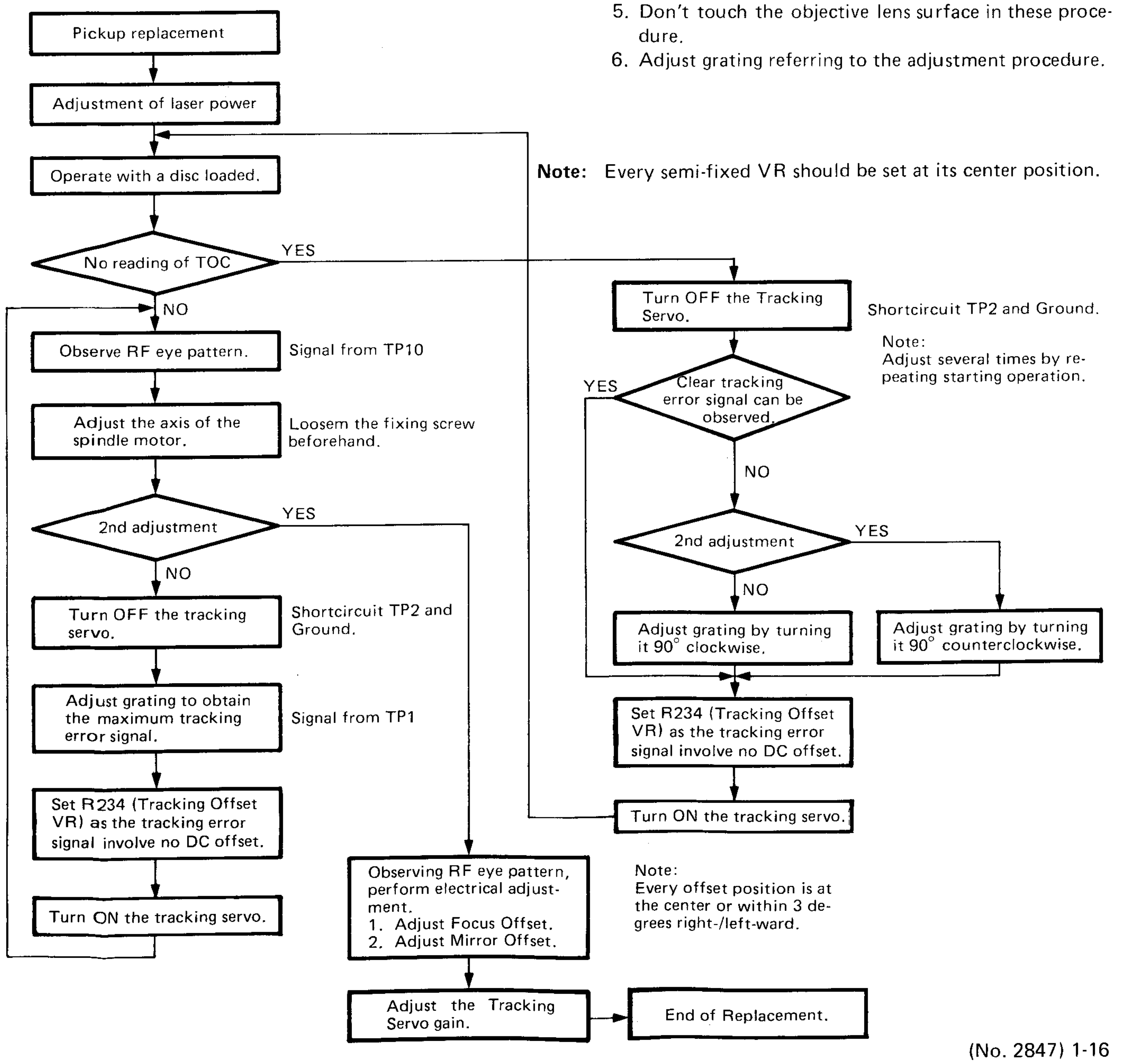
**12-(2) Replacement of the pickup and procedure of adjustment**

1. Remove the old pickup from the pickup base assembly with loosing three screws, and disconnect two connectors.
2. Take out a new pickup from the package, and connect two connectors.
3. To replace the pickup, turn the adjustment screw so that its protruding section faces the left-hand side (pickup side) as shown in the figure below. Also, if a spacer is inserted, remove this spacer because it is not necessary.


Spacer
Pickup Base
Pickup
Adjustment Screw

4. Attach it to the pickup base with three screws.
5. Don't touch the objective lens surface in these procedure.
6. Adjust grating referring to the adjustment procedure.

**Note:** Every semi-fixed VR should be set at its center position.


Pickup replacement
Adjustment of laser power
Operate with a disc loaded.
No reading of TOC
YES
NO
Observe RF eye pattern.
Signal from TP10
Adjust the axis of the spindle motor.
Loosem the fixing screw beforehand.
2nd adjustment
YES
NO
Turn OFF the tracking servo.
Shortcircuit TP2 and Ground.
Adjust grating to obtain the maximum tracking error signal.
Signal from TP1
Set R234 (Tracking Offset VR) as the tracking error signal involve no DC offset.
Turn ON the tracking servo.
Observing RF eye pattern, perform electrical adjustment.
1. Adjust Focus Offset.
2. Adjust Mirror Offset.
Adjust the Tracking Servo gain.
End of Replacement.
Turn OFF the Tracking Servo.
Shortcircuit TP2 and Ground.
Note:
Adjust several times by repeating starting operation.
Clear tracking error signal can be observed.
YES
NO
2nd adjustment
YES
NO
Adjust grating by turning it 90° clockwise.
Adjust grating by turning it 90° counterclockwise.
Set R234 (Tracking Offset VR) as the tracking error signal involve no DC offset.
Turn ON the tracking servo.
Note:
Every offset position is at the center or within 3 degrees right-/left-ward.

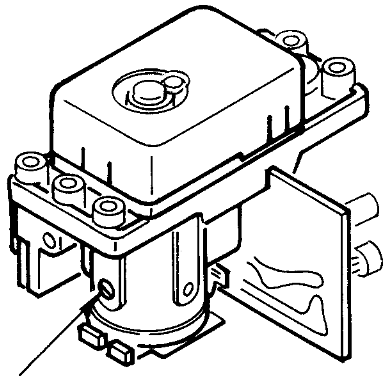
# 13. Adjustment Procedures

**13-(1) PLL freerun adjustment**

1) Adjustment instrument
   Frequency counter
2) Adjusting procedure
   1. Connect the frequency counter between ENN-020 TP ⑪ and GND.
   2. Short the TP ⑩ and GND.
   3. Adjust the L601 to 4.322±0.001 MHz indicated on the frequency counter with the regulating rod.
   4. Perform this checking no sooner than switching on the power.

**13-(2) Grating adjustment**

1) Adjustment instruments
   Oscilloscope, Normal disc
2) Adjusting procedure
   1. Connect the oscilloscope between ENN-020 TP ① and GND.
   2. Play the disc.
   3. Play the disc until 1/3 of the program area is played. (15 minutes in passing time at 34 mm radius)
   4. Short the TP ⑬ to GND, and TP ② to GND simultaneously.
   5. Drive the grating adjustment screw of the laser pickup, and find the point where the tracking error signal (waveform on the oscilloscope) becames maximum amplitude, and then fix it.
   6. Return the pickup to the inner track and make sure that the amplitude is no change.
   7. Advance the pickup to the outer track and make sure that the amplitude is no change.

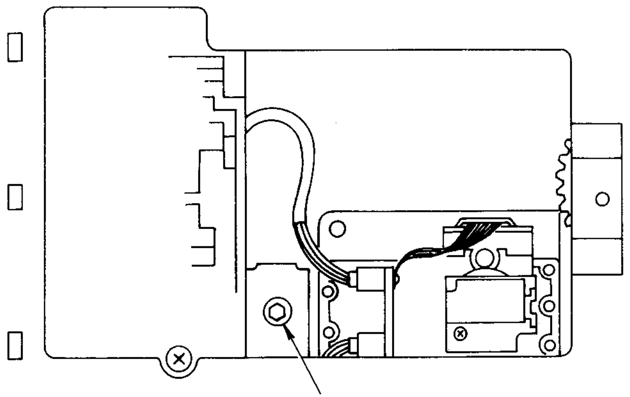


Grating adjustment screw

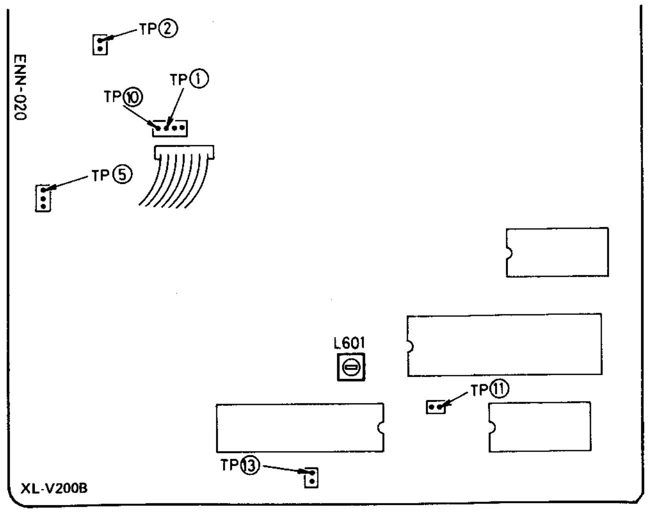
**Note:** After shorting the TP ⑬ to GND, it will be irregular indication on FL. display. This phenomena has no problem with these adjustment.
In the case of it can't recover to the normalcy after disconnect two wires that are shorting the TP ⑬ to GND and TP ② to GND, it can restart by Power SW.

**13-(3) Y Axis adjustment**

1) Adjustment instrument
   Oscilloscope, Hexagonal wrench (2 mm), Normal disc
2) Adjustment procedure
   1. Connect the oscilloscope between ENN-020 TP ⑩ and GND.
   2. Play the disc.
   3. Drive the Y axis adjustment screw under the pickup base, and find the point where the RF signal (waveform on the oscilloscope) becomes maximum amplitude and the finest waveform.
   4. This adjustment performs inner area of the disc.
   5. Advance the pickup to the outer track and make sure that the amplitude doesn't come down 2/3 below of inner track.



Y axis adjustment screw


ENN-020
TP②
TP⑩
TP①
TP⑤
L601
TP⑪
TP⑬
XL-V200B

### 13-(4) Focusing offset adjustment

1) Adjustment instrument
   Oscilloscope, Normal disc
2) Adjustment procedure
   1. Connect the oscilloscope between ENN-020 TP ⑩ and GND.
   2. Play the disc.
   3. Adjust the R235 on ENN-021 as the RF signal (waveform on the oscilloscope) becomes maximum amplitude and the finest waveform.

### 13-(5) Tracking gain adjustment

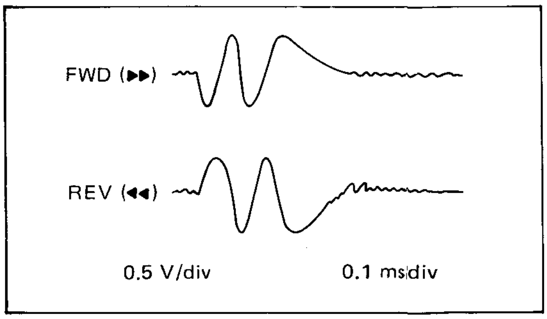
1) Adjustment instrument
   Oscilloscope, Normal disc
2) Adjustment procedure
   1. Connect the oscilloscope between ENN-020 TP ① and GND.
   2. Play the disc.
   3. Short the TP ⑬ to GND, and TP ② to GND simultaneously.
   4. Adjust the R236 on ENN-021 as the tracking error signal (waveform on the oscilloscope) becomes 1.5 Vp-p ~ 2 Vp-p.

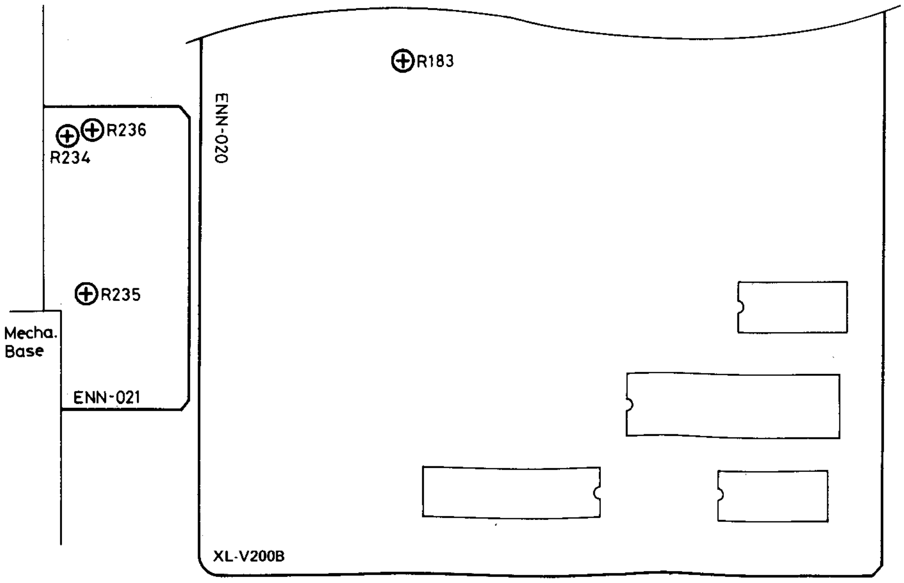
### 13-(6) Tracking offset adjustment

1) Adjustment instrument
   Oscilloscope, Normal disc.
2) Adjustment procedure
   1. Connect the oscilloscope between ENN-020 TP ① and GND.
   2. Play the disc.
   3. Short the TP ⑬ to GND, and TP ② to GND simultaneously.
   4. Adjust the R234 on ENN-021 as making the tracking error signal (waveform on the oscilloscope) that the DC level is 0.

### 13-(7) Kick gain adjustment

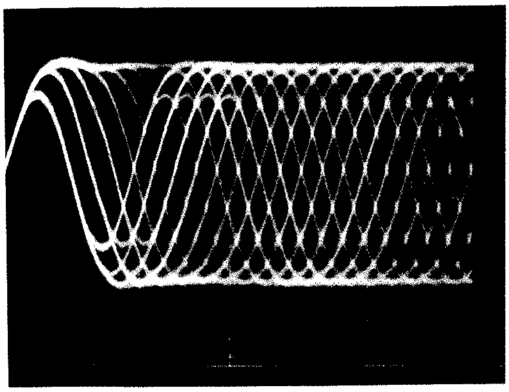
1) Adjustment instrument
   Oscilloscope (2ch), Normal disc.
2) Adjustment procedure
   1. Connect the ch1 of oscilloscope between ENN-020 TP ① and GND, the ch2 of oscilloscope between ENN-020 TP ⑤ and GND.
   2. Turn the oscilloscope Normal mode with triggered by the ch2.
   3. Play the disc.
   4. Set to the manual search mode, and adjust the R183 on ENN-020 as the track jump waveform (displayed on the oscilloscope with pushing the switch FWD ( ▶▶ ) or REV ( ◀◀ ) simultaneously) becomes the pattern below.





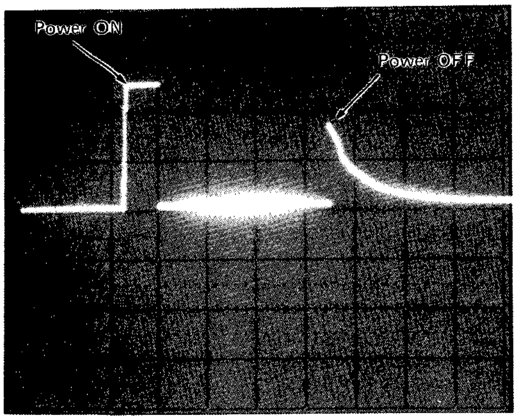
# 14. Important Waveforms

1. **Eye pattern (RF signal)**
   TP-10; standard eye pattern.



Eye pattern 0.5 μs/div 0.5 V/div

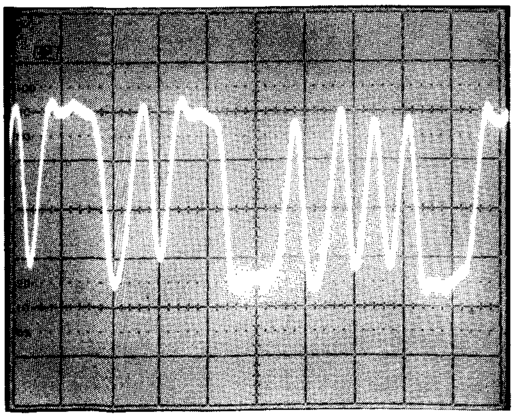
2. **Reset signal of microcomputer**
   Q301 collector (IC301 Pin ㊾ )



10μs/div 2 V/div

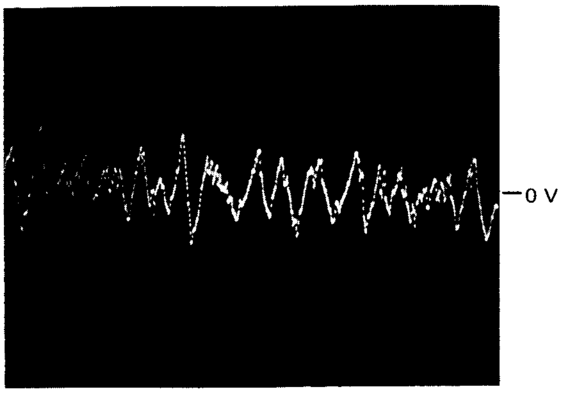
3. **Eye pattern partially expanded**
   Shows the TP-10 eye pattern.

Each eye pattern



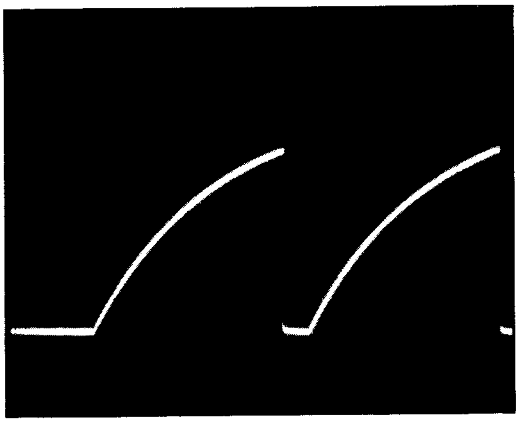
0.5 μs/div 0.5 V/div

4. **Focus signal during play**
   TP-9 operates with period of about 0.2 – 1 ms.



1 ms/div 0.1 V/div

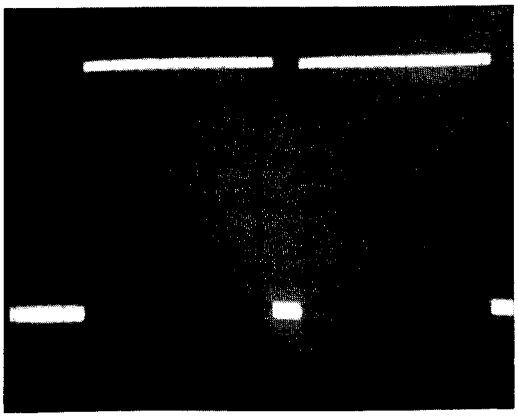
5. **Focus search voltage**
   Between connecting point R115, R117 and GND; the waveform lens is moved up and down by this voltage when the platter is loaded without a disc.



0.5 s/div 1 V/div

6 **Pulse for focus search voltage**
   Pulse for focus search transmitted from IC601

IC601 Pin ⑫ FCS signal

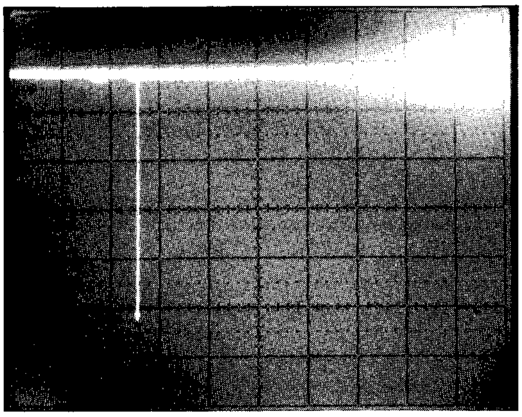


0.5 s/div 1 V/div

### 7. Focus zero-cross output

Pulse showing that focus output waveform has almost passed the zero point.

IC101 Pin ⑬ output

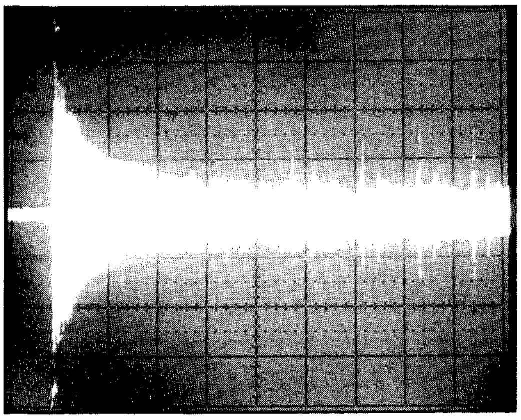


2 ms/div 1 V/div

### 8 Focus drive waveform

Waveform until focus is obtained, spindle motor starts to rotate and TOC is read.

TP-9, when focus has been finished and motor starts to rotate

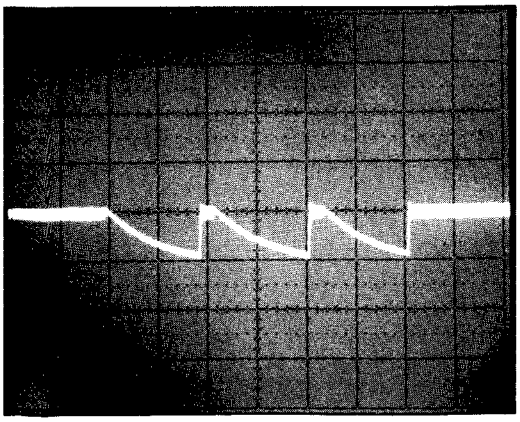


0.2 s/div 1 V/div

### 9. Drive waveform during focus search

Drive waveform of focus coil when the platter is loaded without a disc.

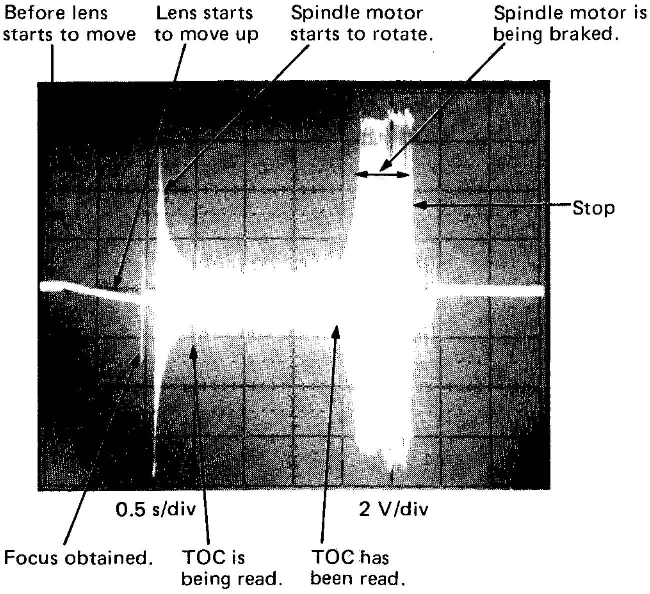
TP-9; focus signal when no disc is loaded



1 s/div 1 V/div

### 10. Waveform until TOC is read

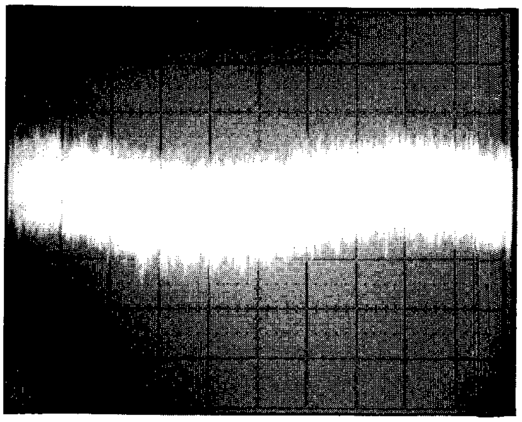
TP-9 until TOC has been read and spindle motor stops



### 11. Tracking waveform during normal play

TP-6 output

Waveform during TP-6 play

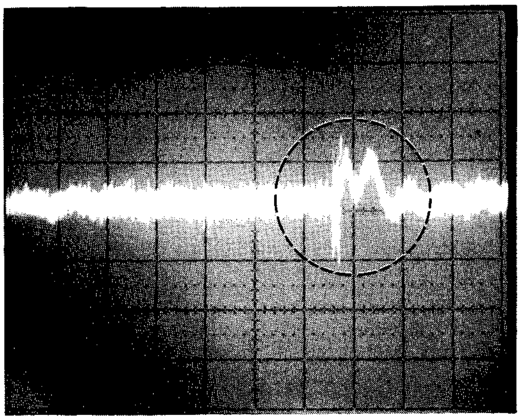


20 ms/div 50 mV/div

**12. TP-6 waveform of high speed search in forward direction**

Output when track is jumped is visible

TP-6; in case of transporting in high speed search ▶▶

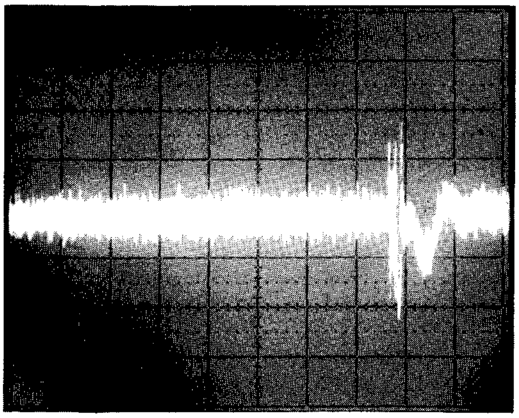


5 ms/div 0.2 V/div

**13. TP-6 waveform of high speed search in backward direction**

The waveform the reverse of that in high speed search in forward direction is shown.

TP-6; in case of returning by high speed search ◀◀

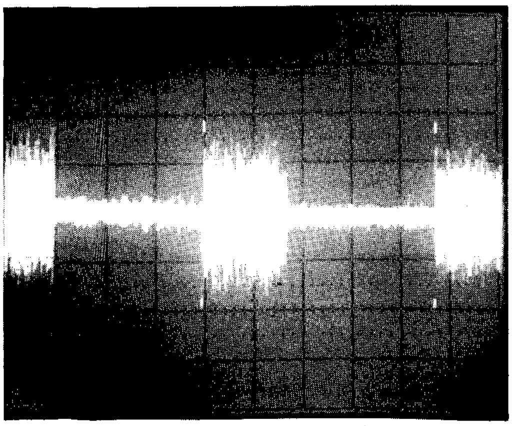


5 ms/div 0.2 V/div

**14. Drive waveform during high speed search**

Output such as noise is output when track is crossed.

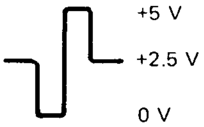
TP-6 during high speed search



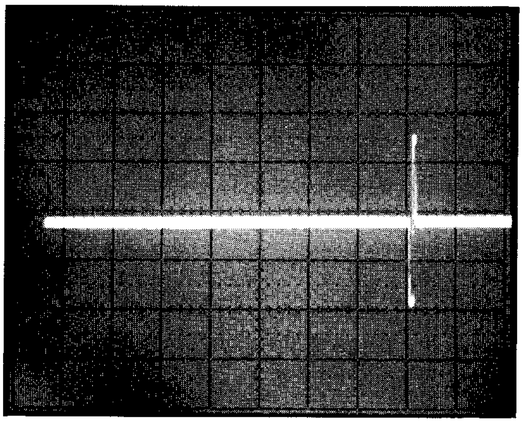
10 ms/div 1 V/div

**15. Kick pulse when searching**

When advancing the track, waveform below is output.



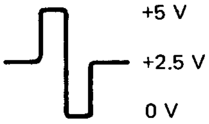
Kick pulse of TP-4 when ▶▶ is used.



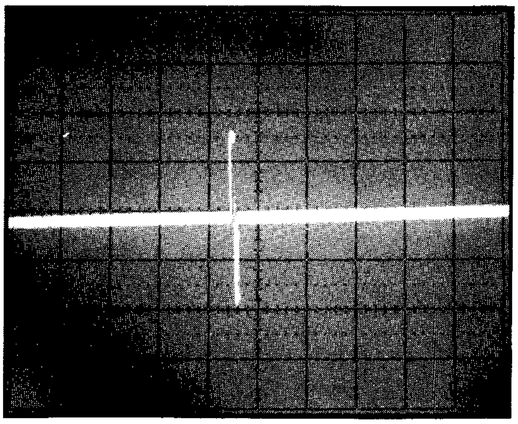
5 ms/div 0.5 V/div

**16. Kick pulse when searching**

When returning the track, waveform below is output.



Kick pulse of TP-4 when ◀◀ is used.

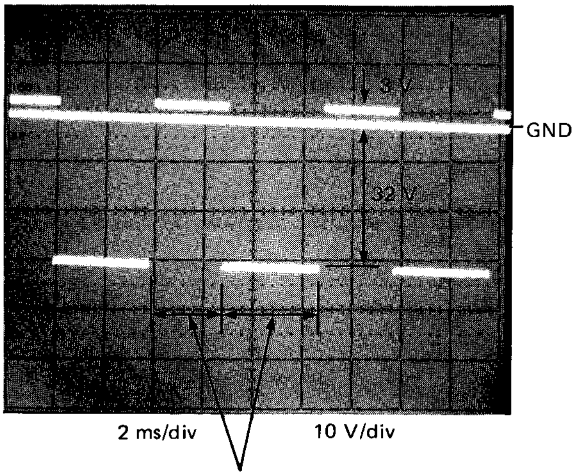


5 ms/div 0.5 V/div

### 17. Part of FL drive waveform

Duty is changed depending on letter indicated.

IC301 Pin ① FL drive waveform (changes depending on the indication)

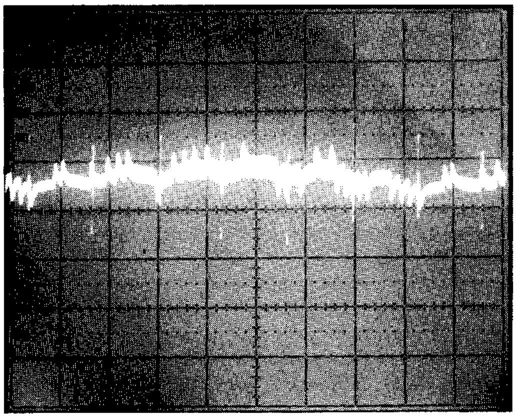


2 ms/div 10 V/div

This width changes.

### 18. Spindle motor drive waveform during play

Spindle motor drive waveform during play

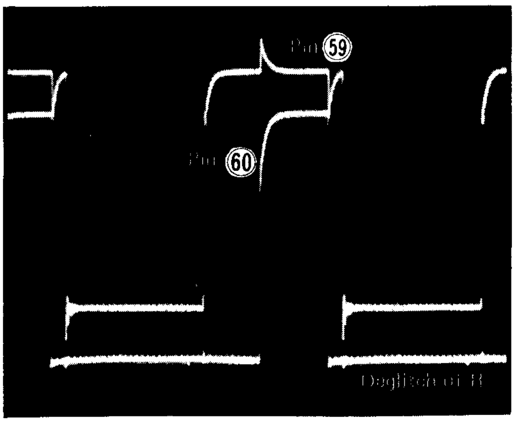


20 ms/div 1.0 V/div

### 19. L/R switching signal and deglitch signal of R

R deglitch signal is input when switching signal is at "H" level.

Waveforms of IC502 Pins (59) and (60)

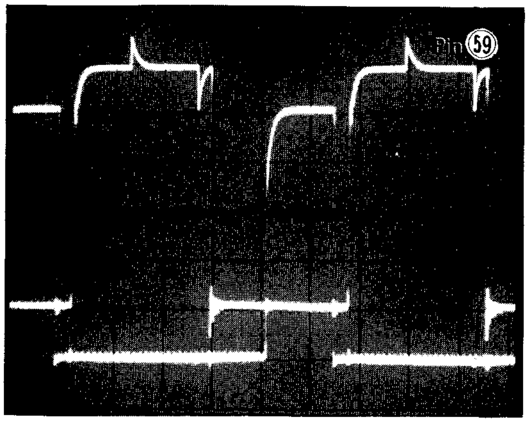


2 μs/div 1 V/div

### 20. L/R switching signal and deglitch signal of L

L deglitch signal is input when switching signal is at "L" level.

Waveforms of IC502 Pins (59) and (61)



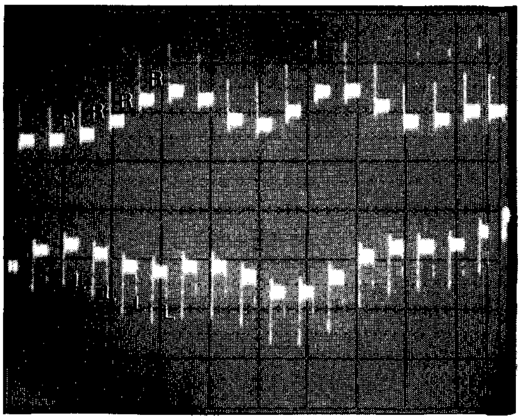
2 μs/div 1 V/div

**Note:** Photos ⑲ and ⑳ are shifted by 1 V for better visibility.

### 21. AF signal switched after D/A

Waveform showing that R and L are output alternately.

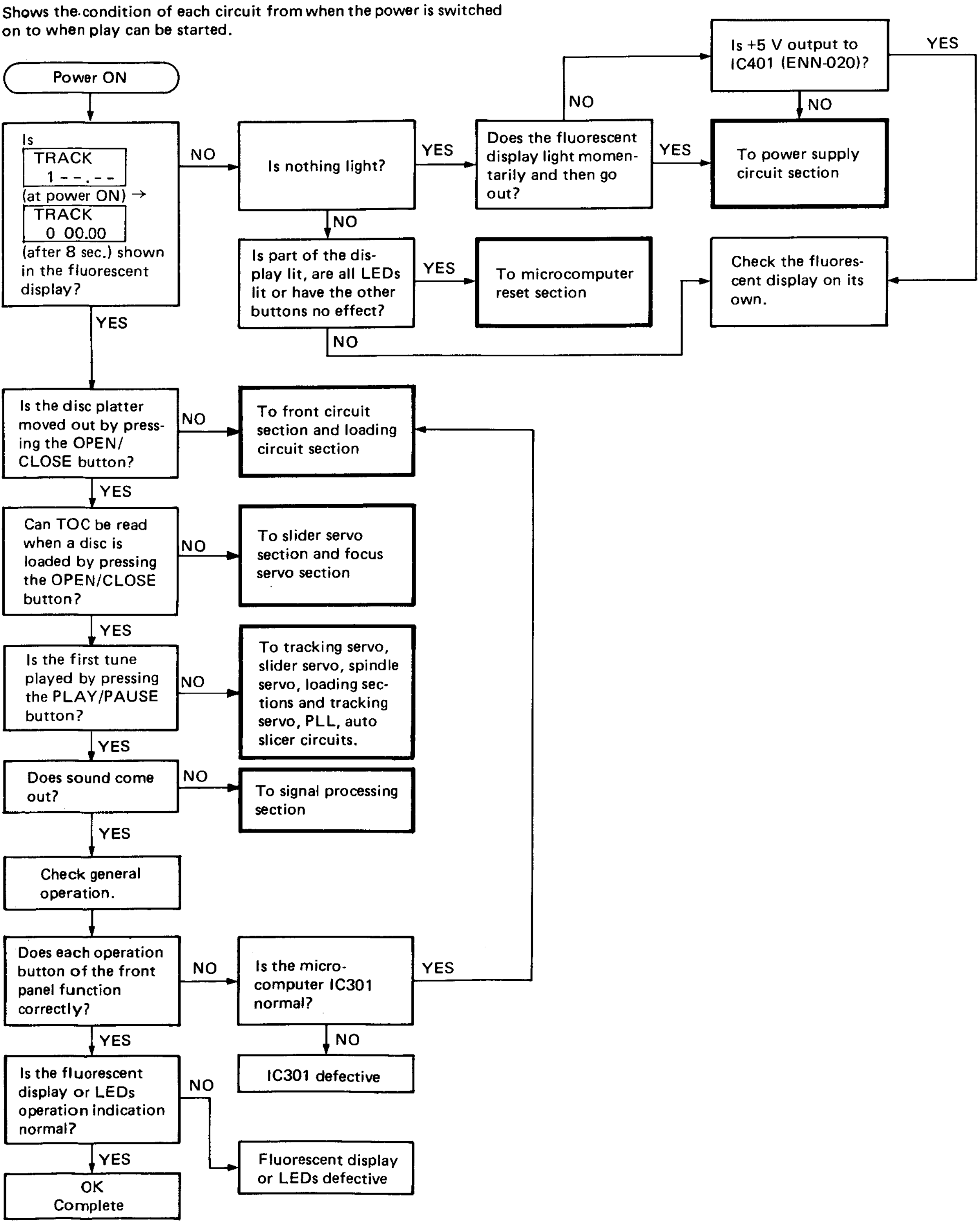
R/L signal switched of IC503 Pin ⑰



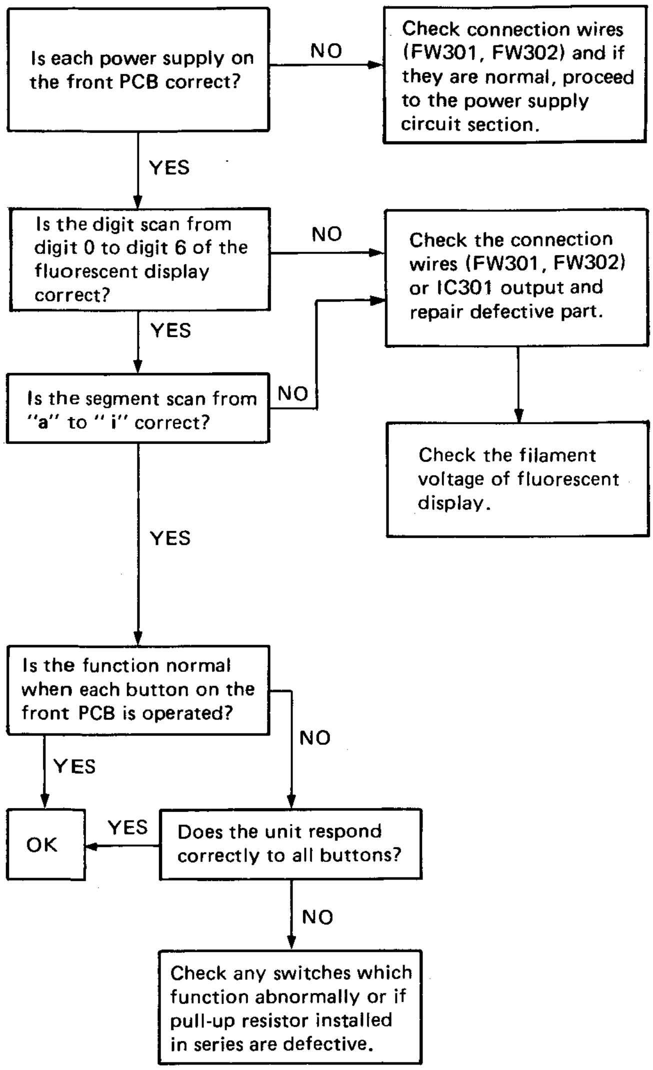
10 μs/div 0.5 V/div

# 15. Troubleshooting

Shows the condition of each circuit from when the power is switched on to when play can be started.

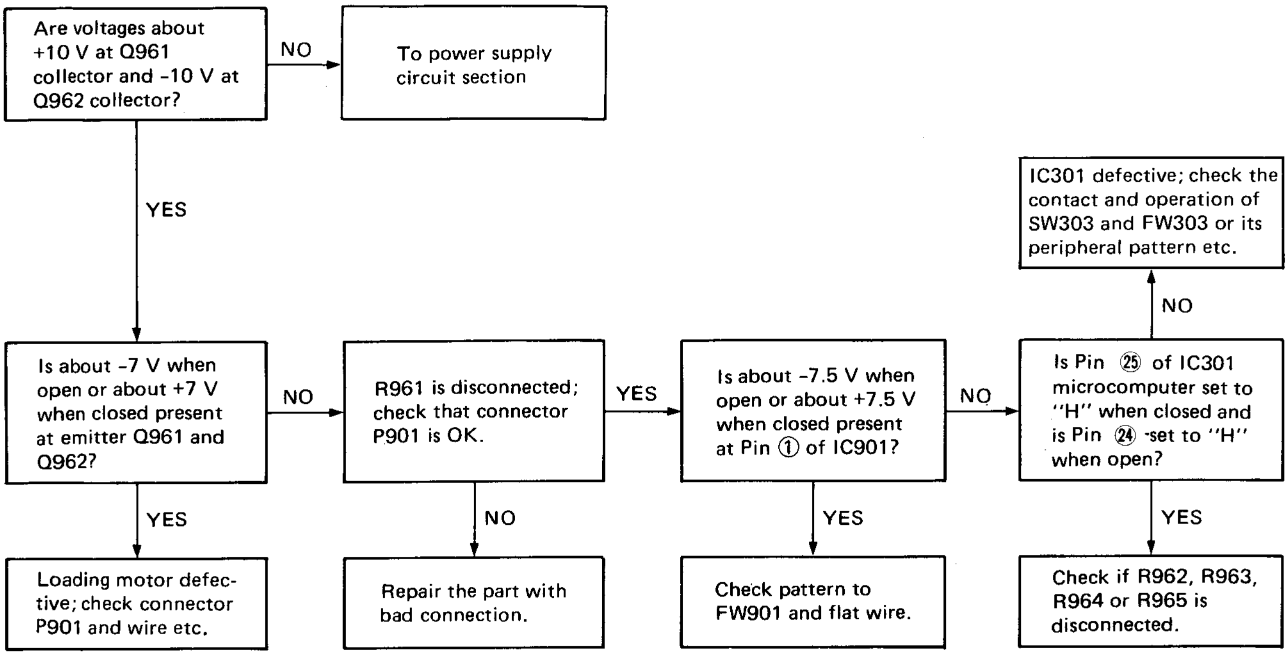

Power ON
Is TRACK 1 - - . - - (at power ON) → TRACK 0 00.00 (after 8 sec.) shown in the fluorescent display?
NO
Is nothing light?
YES
Does the fluorescent display light momentarily and then go out?
YES
To power supply circuit section
NO
Is +5 V output to IC401 (ENN-020)?
YES
NO
NO
Is part of the display lit, are all LEDs lit or have the other buttons no effect?
YES
To microcomputer reset section
NO
Check the fluorescent display on its own.
YES
Is the disc platter moved out by pressing the OPEN/CLOSE button?
NO
To front circuit section and loading circuit section
YES
Can TOC be read when a disc is loaded by pressing the OPEN/CLOSE button?
NO
To slider servo section and focus servo section
YES
Is the first tune played by pressing the PLAY/PAUSE button?
NO
To tracking servo, slider servo, spindle servo, loading sections and tracking servo, PLL, auto slicer circuits.
YES
Does sound come out?
NO
To signal processing section
YES
Check general operation.
Does each operation button of the front panel function correctly?
NO
Is the microcomputer IC301 normal?
YES
NO
IC301 defective
YES
Is the fluorescent display or LEDs operation indication normal?
NO
Fluorescent display or LEDs defective
YES
OK Complete

## Front PCB section

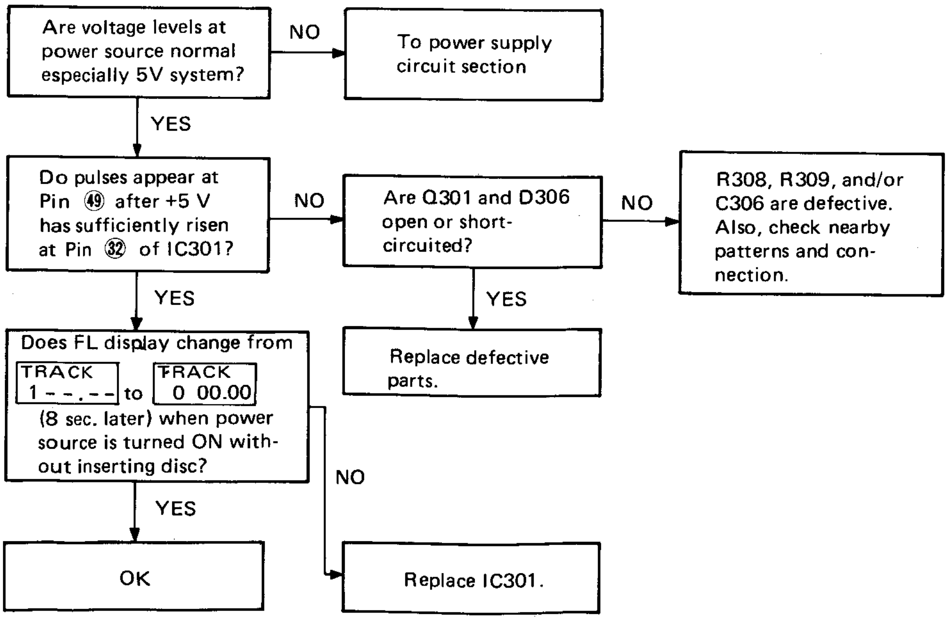

Is each power supply on the front PCB correct?
NO
Check connection wires (FW301, FW302) and if they are normal, proceed to the power supply circuit section.
YES
Is the digit scan from digit 0 to digit 6 of the fluorescent display correct?
NO
Check the connection wires (FW301, FW302) or IC301 output and repair defective part.
YES
Is the segment scan from "a" to " i" correct?
NO
Check the filament voltage of fluorescent display.
YES
Is the function normal when each button on the front PCB is operated?
NO
YES
OK
YES
Does the unit respond correctly to all buttons?
NO
Check any switches which function abnormally or if pull-up resistor installed in series are defective.

## Loading circuit

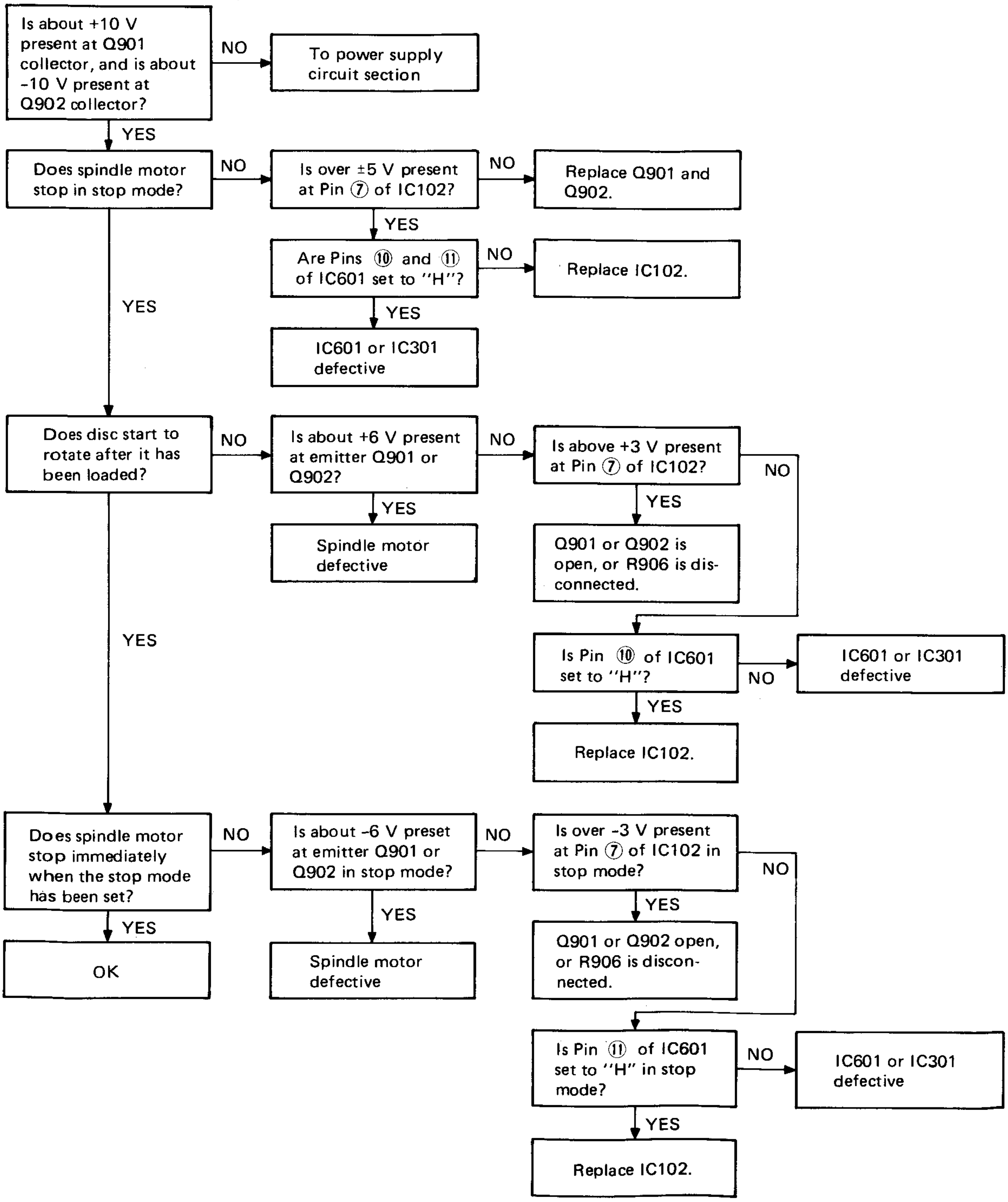
(Perform these steps when the drawer does not move even when the OPEN/CLOSE button on the front panel is pressed.)


Are voltages about +10 V at Q961 collector and -10 V at Q962 collector?
NO
To power supply circuit section
YES
Is about -7 V when open or about +7 V when closed present at emitter Q961 and Q962?
NO
R961 is disconnected; check that connector P901 is OK.
YES
Is about -7.5 V when open or about +7.5 V when closed present at Pin ① of IC901?
NO
Is Pin ㉕ of IC301 microcomputer set to "H" when closed and is Pin ㉔ set to "H" when open?
NO
IC301 defective; check the contact and operation of SW303 and FW303 or its peripheral pattern etc.
YES
Loading motor defective; check connector P901 and wire etc.
NO
Repair the part with bad connection.
YES
Check pattern to FW901 and flat wire.
YES
Check if R962, R963, R964 or R965 is disconnected.

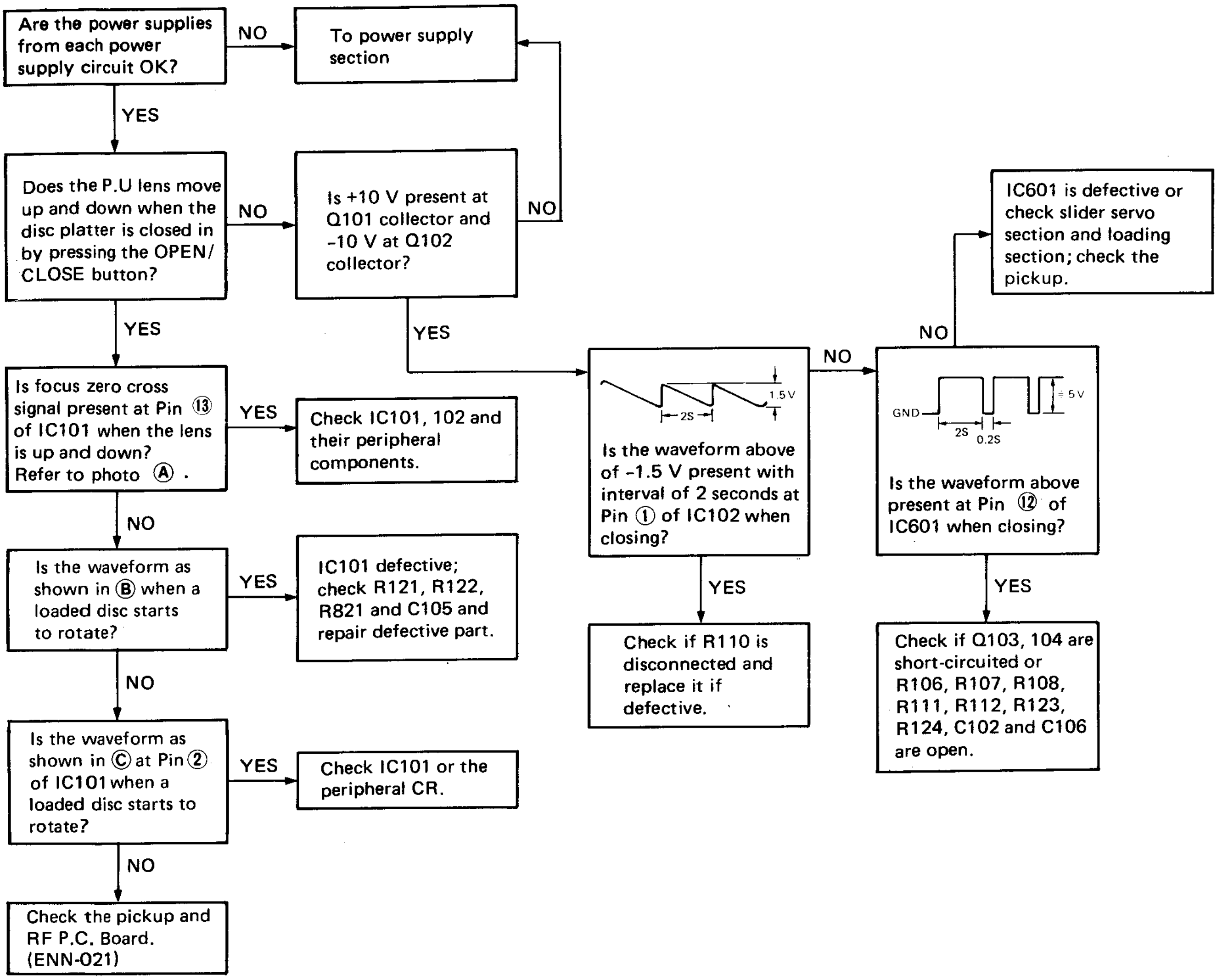
## Reset circuit section


Are voltage levels at power source normal especially 5V system?
NO
To power supply circuit section
YES
Do pulses appear at Pin ㊾ after +5 V has sufficiently risen at Pin ㉜ of IC301?
NO
Are Q301 and D306 open or short-circuited?
NO
R308, R309, and/or C306 are defective. Also, check nearby patterns and connection.
YES
Replace defective parts.
YES
Does FL display change from TRACK 1 - - . - - to TRACK 0 00.00 (8 sec. later) when power source is turned ON without inserting disc?
YES
OK
NO
Replace IC301.

## Spindle motor section

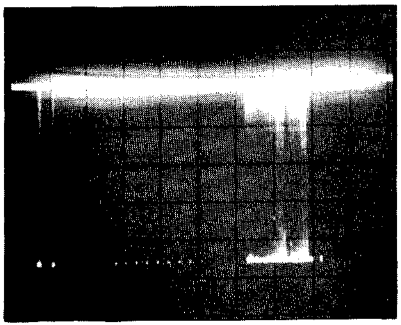

Is about +10 V present at Q901 collector, and is about -10 V present at Q902 collector?
NO
To power supply circuit section
YES
Does spindle motor stop in stop mode?
NO
Is over ±5 V present at Pin ⑦ of IC102?
NO
Replace Q901 and Q902.
YES
Are Pins ⑩ and ⑪ of IC601 set to "H"?
NO
Replace IC102.
YES
IC601 or IC301 defective
YES
Does disc start to rotate after it has been loaded?
NO
Is about +6 V present at emitter Q901 or Q902?
NO
Is above +3 V present at Pin ⑦ of IC102?
NO
YES
Spindle motor defective
YES
Q901 or Q902 is open, or R906 is disconnected.
YES
Is Pin ⑩ of IC601 set to "H"?
NO
IC601 or IC301 defective
YES
Replace IC102.
Does spindle motor stop immediately when the stop mode has been set?
NO
Is about -6 V preset at emitter Q901 or Q902 in stop mode?
NO
Is over -3 V present at Pin ⑦ of IC102 in stop mode?
NO
YES
OK
YES
Spindle motor defective
YES
Q901 or Q902 open, or R906 is disconnected.
Is Pin ⑪ of IC601 set to "H" in stop mode?
NO
IC601 or IC301 defective
YES
Replace IC102.

## Focus servo section


Are the power supplies from each power supply circuit OK?
NO
To power supply section
YES
Does the P.U lens move up and down when the disc platter is closed in by pressing the OPEN/CLOSE button?
NO
Is +10 V present at Q101 collector and -10 V at Q102 collector?
NO
YES
YES
Is focus zero cross signal present at Pin ⑬ of IC101 when the lens is up and down? Refer to photo Ⓐ .
YES
Check IC101, 102 and their peripheral components.
NO
Is the waveform as shown in Ⓑ when a loaded disc starts to rotate?
YES
IC101 defective; check R121, R122, R821 and C105 and repair defective part.
NO
Is the waveform as shown in Ⓒ at Pin ② of IC101 when a loaded disc starts to rotate?
YES
Check IC101 or the peripheral CR.
NO
Check the pickup and RF P.C. Board. (ENN-021)
1.5V
2S
Is the waveform above of -1.5 V present with interval of 2 seconds at Pin ① of IC102 when closing?
NO
YES
Check if R110 is disconnected and replace it if defective.
GND
≒5V
2S
0.2S
Is the waveform above present at Pin ⑫ of IC601 when closing?
NO
IC601 is defective or check slider servo section and loading section; check the pickup.
YES
Check if Q103, 104 are short-circuited or R106, R107, R108, R111, R112, R123, R124, C102 and C106 are open.

**Ⓐ Output waveform of focus zero-cross**
Minus pulse is generated when focus signal passes near zero.

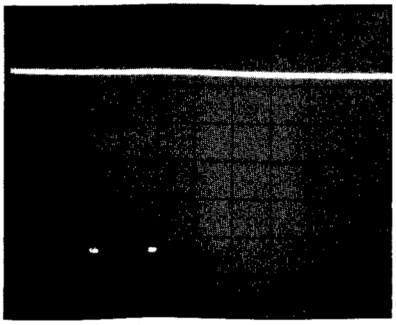
IC101 Pin ⑬



0.2 s/div 5 V/div

**Ⓑ Waveform when focus zero-cross is started to play**
Focus zero-cross signal just before play starts; pulse width is about 10 ms.

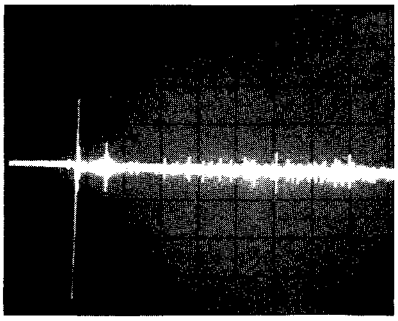
IC101 Pin ⑬



50 ms/div 5 V/div

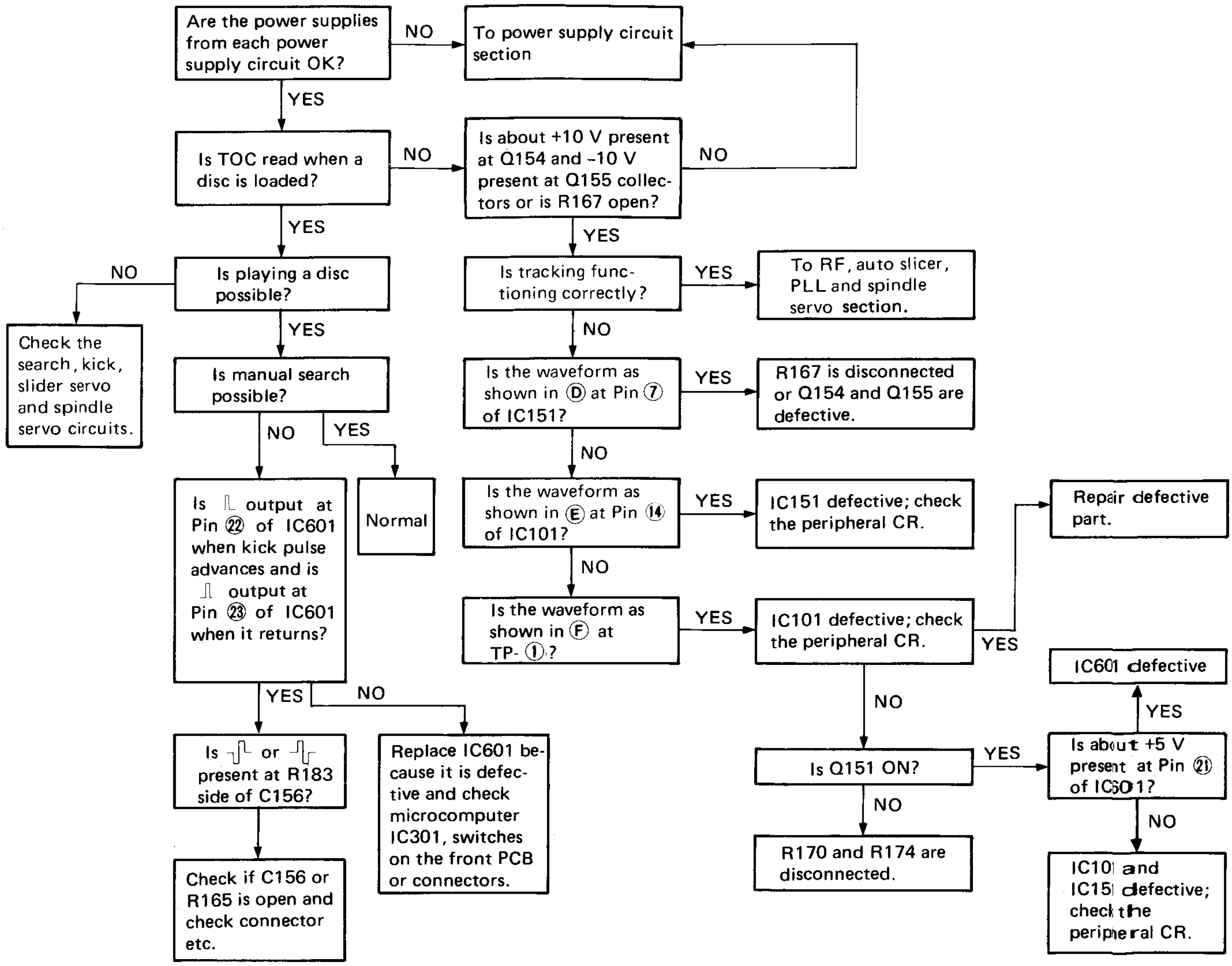
**Ⓒ Focus signal when a loaded disc starts to be played**
Strong signal is output when focus starts to be obtained but it becomes of small amplitude when it enters in servo loop.

IC101 Pin ②



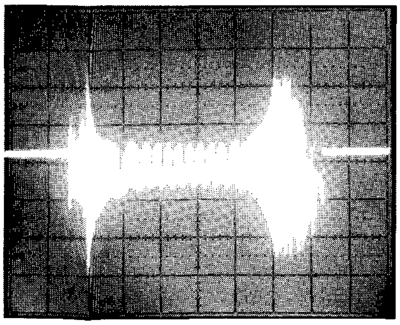
0.1 s/div 0.5 V/div

## Tracking servo section


Are the power supplies from each power supply circuit OK?
NO
To power supply circuit section
YES
Is TOC read when a disc is loaded?
NO
Is about +10 V present at Q154 and -10 V present at Q155 collectors or is R167 open?
NO
YES
Is playing a disc possible?
NO
Check the search, kick, slider servo and spindle servo circuits.
YES
Is manual search possible?
NO
YES
Normal
Is ⎍ output at Pin ㉒ of IC601 when kick pulse advances and is ⎍ output at Pin ㉓ of IC601 when it returns?
YES
NO
Is ⎍ or ⎍ present at R183 side of C156?
Check if C156 or R165 is open and check connector etc.
Replace IC601 because it is defective and check microcomputer IC301, switches on the front PCB or connectors.
Is tracking functioning correctly?
YES
To RF, auto slicer, PLL and spindle servo section.
NO
Is the waveform as shown in Ⓓ at Pin ⑦ of IC151?
YES
R167 is disconnected or Q154 and Q155 are defective.
NO
Is the waveform as shown in Ⓔ at Pin ⑭ of IC101?
YES
IC151 defective; check the peripheral CR.
NO
Is the waveform as shown in Ⓕ at TP-①?
YES
IC101 defective; check the peripheral CR.
YES
Repair defective part.
NO
Is Q151 ON?
YES
Is about +5 V present at Pin ㉑ of IC601?
YES
IC601 defective
NO
IC101 and IC151 defective; check the peripheral CR.
NO
R170 and R174 are disconnected.

Ⓓ **Waveform when a disc is loaded**
Shows until brake is operated after TOC has been read.

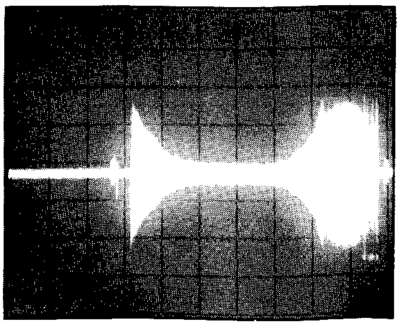
IC151 Pin ⑦



0.2 s/div 2 V/div

Ⓔ **Waveform when a disc is loaded**
Shows until brake is operated after TOC has been read.

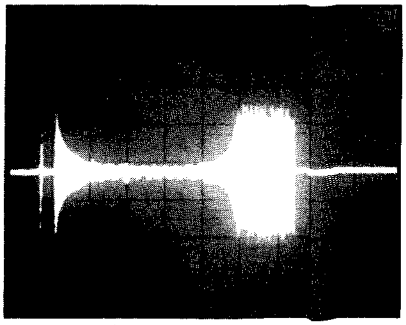
IC101 Pin ⑭



0.2 s/div 5 V/div

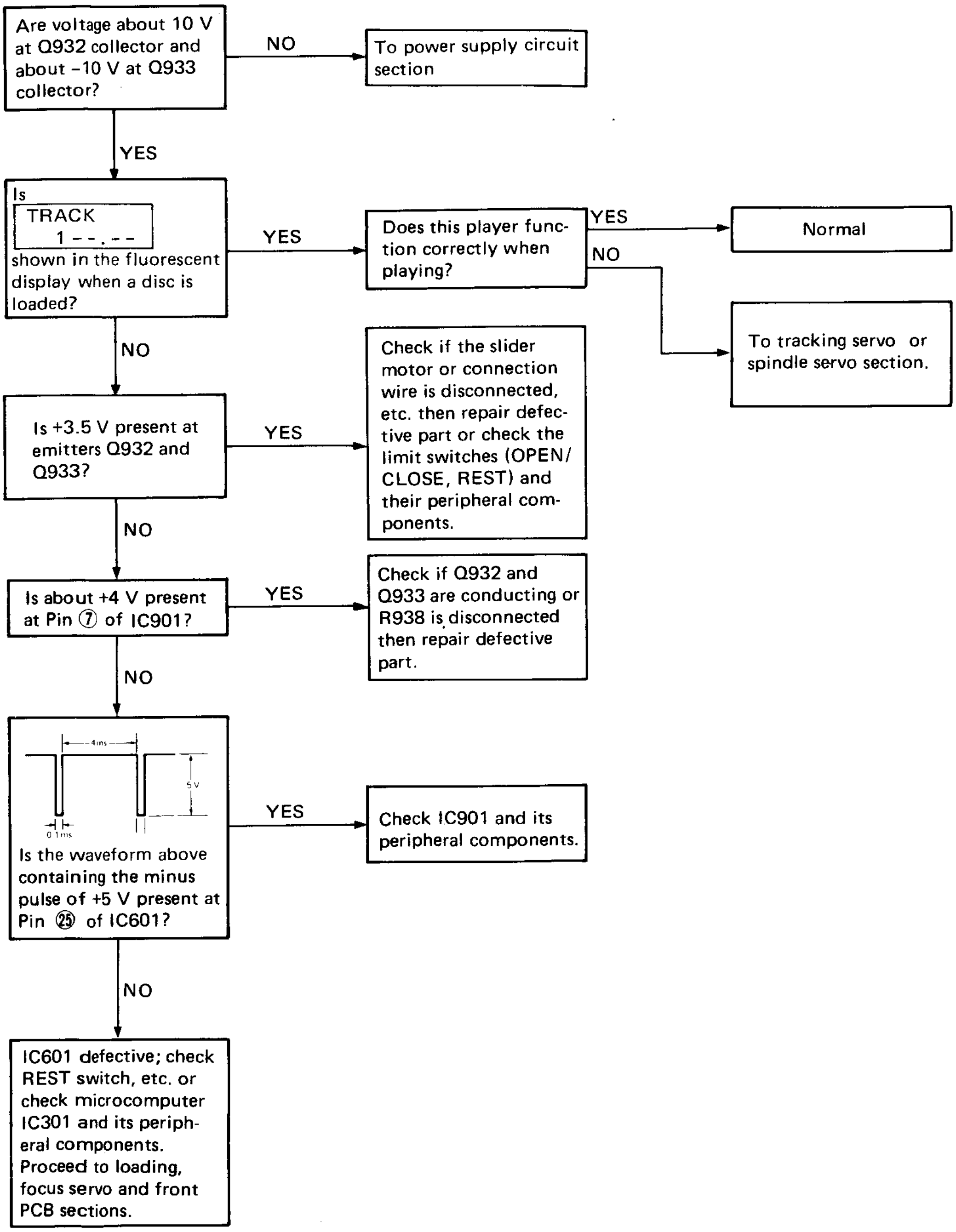
Ⓕ **Waveform when a disc is loaded**
Shows until brake is operated after TOC has been read.

TP-①



0.2 s/div 0.5 V/div

## Slider servo section



Are voltage about 10 V at Q932 collector and about −10 V at Q933 collector?

To power supply circuit section

Is TRACK 1 - - . - - shown in the fluorescent display when a disc is loaded?

Does this player function correctly when playing?

Normal

To tracking servo or spindle servo section.

Is +3.5 V present at emitters Q932 and Q933?

Check if the slider motor or connection wire is disconnected, etc. then repair defective part or check the limit switches (OPEN/CLOSE, REST) and their peripheral components.

Is about +4 V present at Pin ⑦ of IC901?

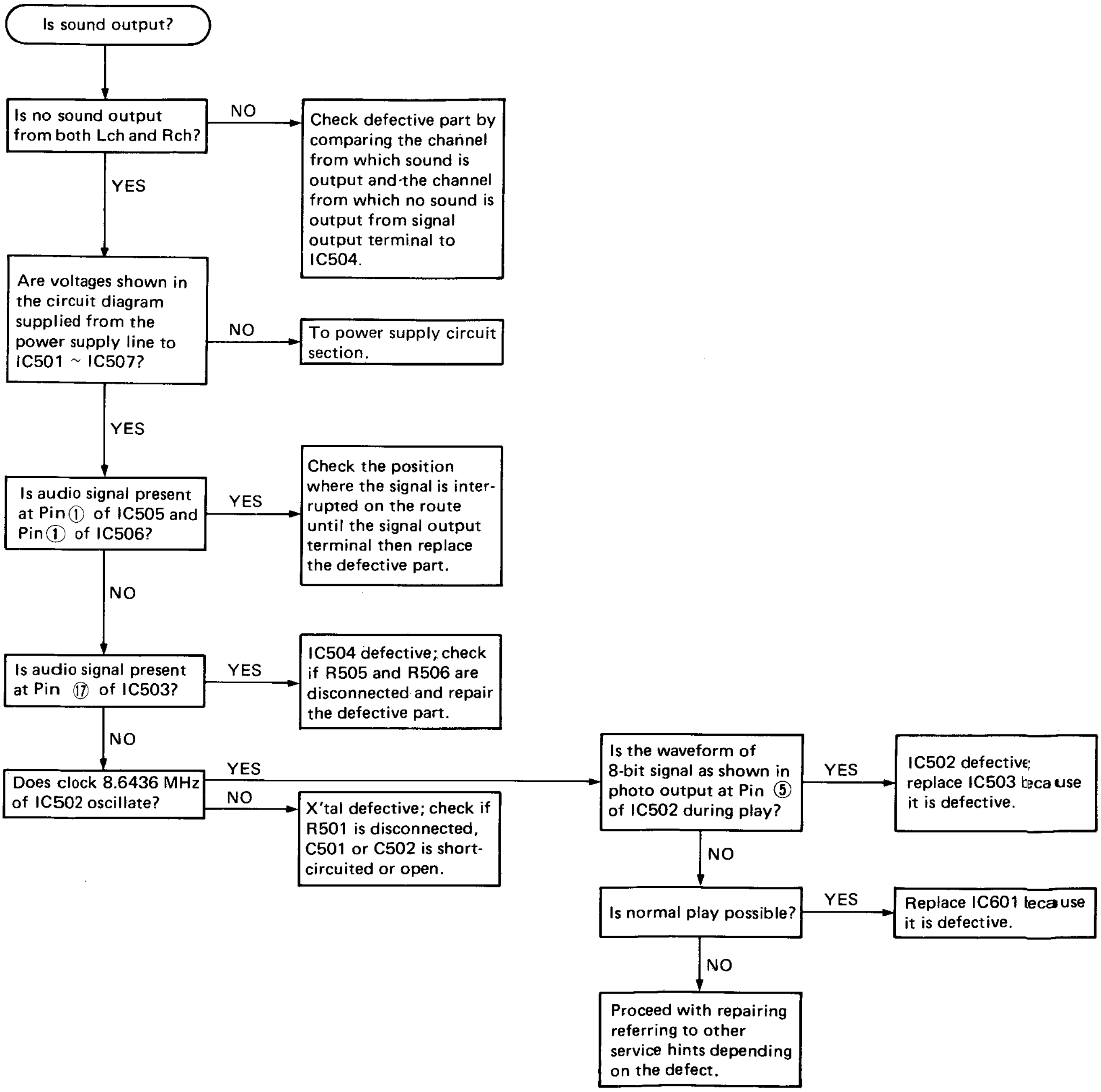
Check if Q932 and Q933 are conducting or R938 is disconnected then repair defective part.

Is the waveform above containing the minus pulse of +5 V present at Pin ㉕ of IC601?

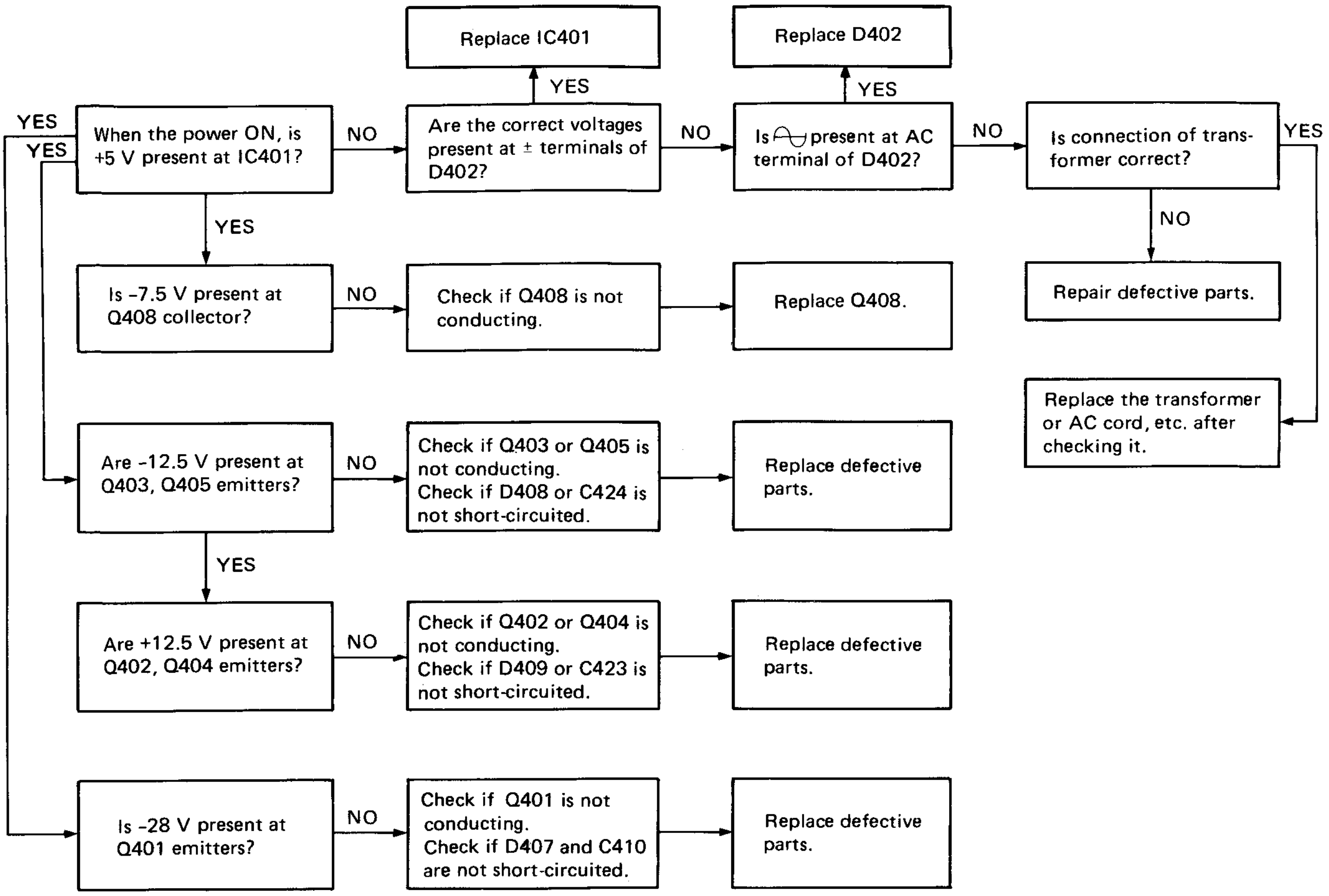
Check IC901 and its peripheral components.

IC601 defective; check REST switch, etc. or check microcomputer IC301 and its peripheral components. Proceed to loading, focus servo and front PCB sections.

## Signal Processing Section

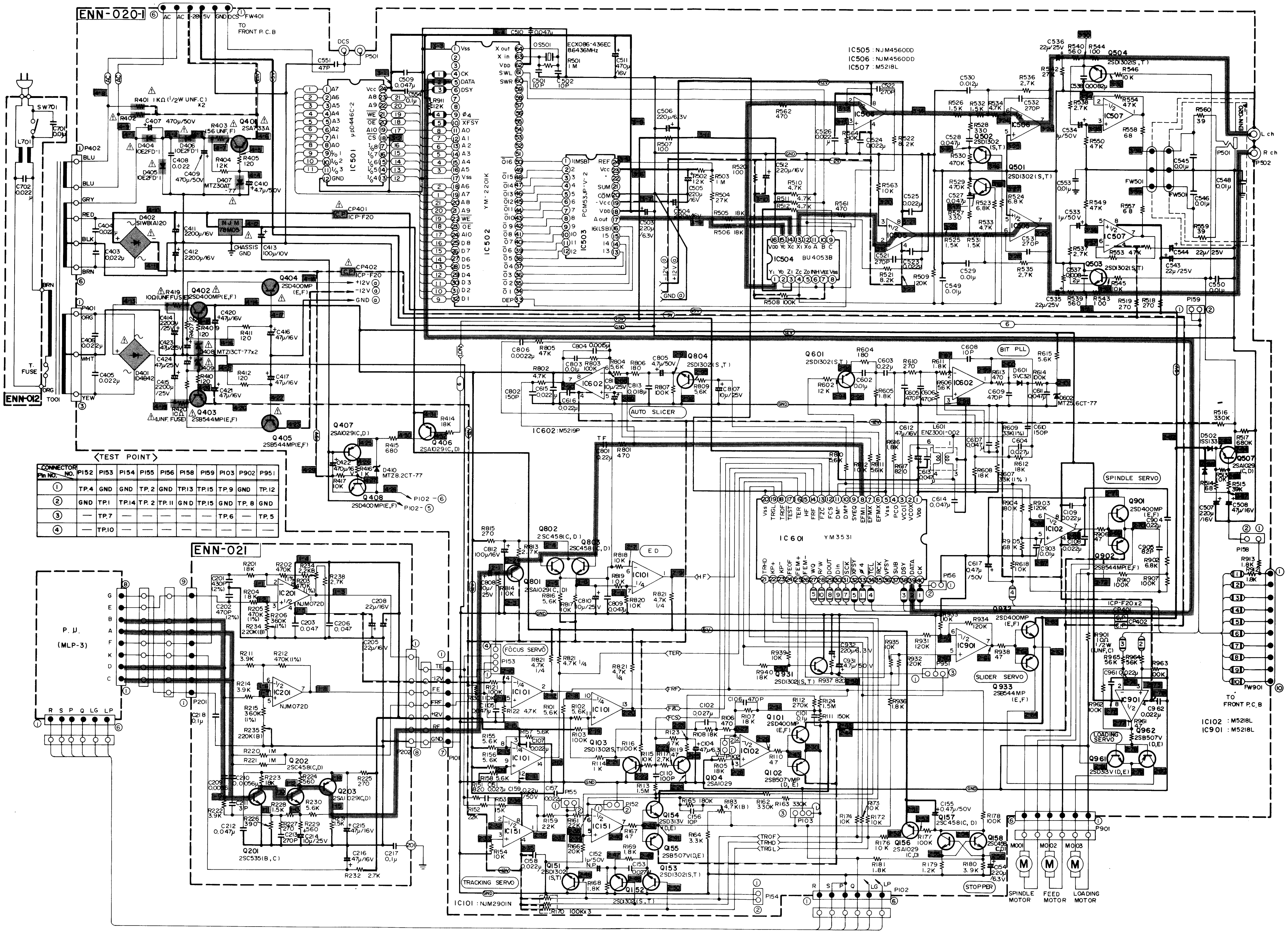

Is sound output?
Is no sound output from both Lch and Rch?
NO
Check defective part by comparing the channel from which sound is output and the channel from which no sound is output from signal output terminal to IC504.
YES
Are voltages shown in the circuit diagram supplied from the power supply line to IC501 ~ IC507?
NO
To power supply circuit section.
YES
Is audio signal present at Pin ① of IC505 and Pin ① of IC506?
YES
Check the position where the signal is interrupted on the route until the signal output terminal then replace the defective part.
NO
Is audio signal present at Pin ⑰ of IC503?
YES
IC504 defective; check if R505 and R506 are disconnected and repair the defective part.
NO
Does clock 8.6436 MHz of IC502 oscillate?
YES
NO
X'tal defective; check if R501 is disconnected, C501 or C502 is short-circuited or open.
Is the waveform of 8-bit signal as shown in photo output at Pin ⑤ of IC502 during play?
YES
IC502 defective; replace IC503 because it is defective.
NO
Is normal play possible?
YES
Replace IC601 because it is defective.
NO
Proceed with repairing referring to other service hints depending on the defect.

## Power supply circuit section


Replace IC401
Replace D402
YES
YES
YES
YES
When the power ON, is +5 V present at IC401?
NO
Are the correct voltages present at ± terminals of D402?
NO
Is ∿ present at AC terminal of D402?
NO
Is connection of trans-former correct?
YES
YES
NO
Is -7.5 V present at Q408 collector?
NO
Check if Q408 is not conducting.
Replace Q408.
Repair defective parts.
Replace the transformer or AC cord, etc. after checking it.
Are -12.5 V present at Q403, Q405 emitters?
NO
Check if Q403 or Q405 is not conducting.
Check if D408 or C424 is not short-circuited.
Replace defective parts.
YES
Are +12.5 V present at Q402, Q404 emitters?
NO
Check if Q402 or Q404 is not conducting.
Check if D409 or C423 is not short-circuited.
Replace defective parts.
Is -28 V present at Q401 emitters?
NO
Check if Q401 is not conducting.
Check if D407 and C410 are not short-circuited.
Replace defective parts.

# 17. XL-V200B Schematic Diagrams

## 17-(1) XL-V200B Main Section


ENN-020-1
ENN-012
ENN-021
FW401 TO FRONT P.C.B
FW901 TO FRONT P.C.B
P.U. (MLP-3)
IC501 µPD446C-2
IC502 YM-2201K
IC503 PCM53JP-V-2
IC504 BU4053B
IC505 : NJM4560DD
IC506 : NJM4560DD
IC507 : M5218L
IC601 YM3531
IC602 : M5219P
IC101 : NJM2901N
IC102 : M5218L
IC901 : M5218L
IC201 NJM072D
AUTO SLICER
BIT PLL
SPINDLE SERVO
FOCUS SERVO
TRACKING SERVO
SLIDER SERVO
LOADING SERVO
STOPPER
ED
CHASSIS GND
L ch
R ch
SPINDLE MOTOR
FEED MOTOR
LOADING MOTOR
M001
M002
M003

<TEST POINT>

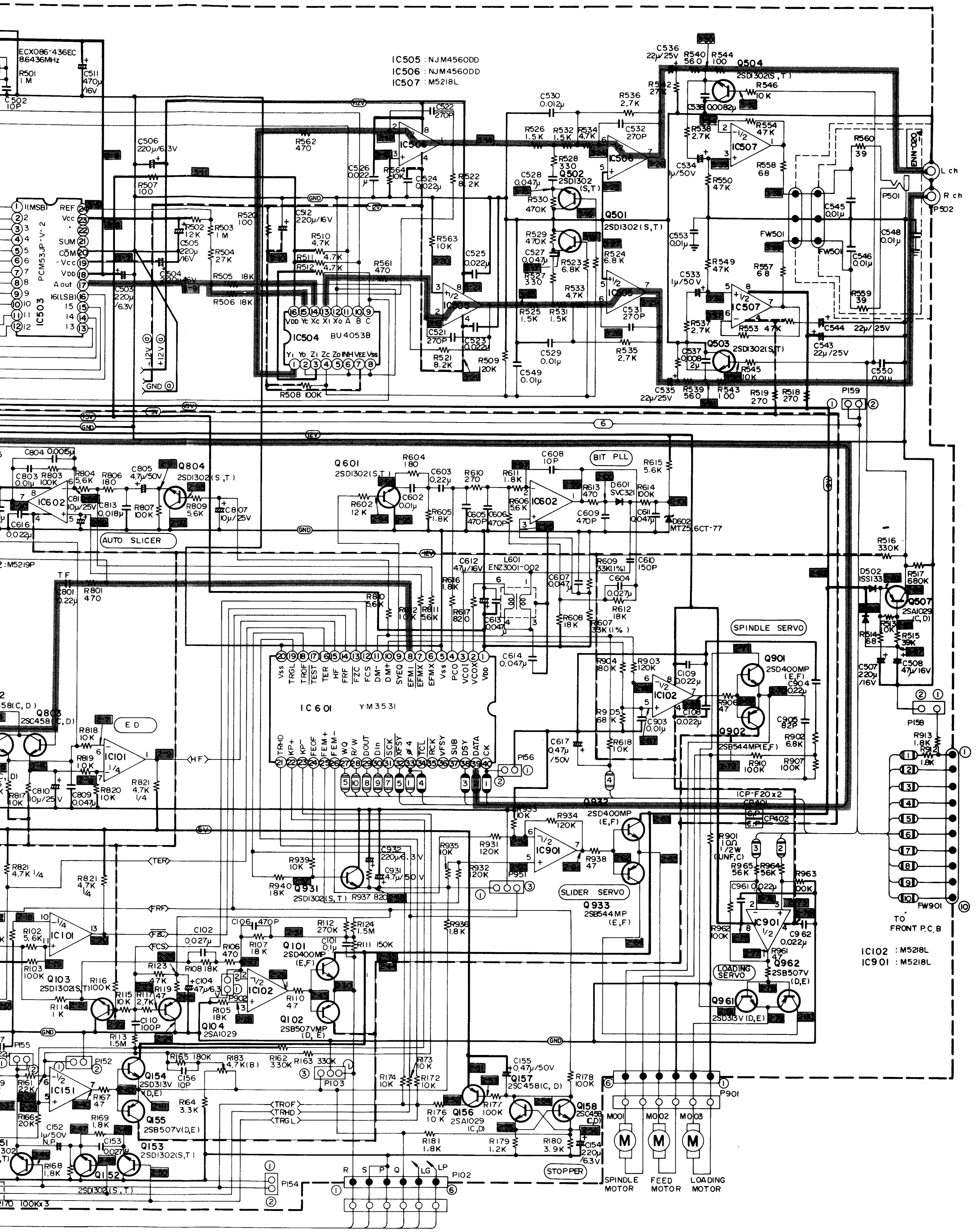
| CONNECTOR NO. / Pin NO. | P152 | P153 | P154 | P155 | P156 | P158 | P159 | P103 | P902 | P951 |
|---|---|---|---|---|---|---|---|---|---|---|
| ① | TP.4 | GND | GND | TP.2 | GND | TP.13 | TP.15 | TP.9 | GND | TP.12 |
| ② | GND | TP.1 | TP.14 | TP.2 | TP.11 | GND | TP.15 | GND | TP.8 | GND |
| ③ | — | TP.7 | — | — | — | — | — | TP.6 | — | TP.5 |
| ④ | — | TP.10 | — | — | — | — | — | — | — | — |

**Notes:**

1. ▇ shows DC voltage to the chassis with no signal input.
2. ——— indicates positive B power supply.
3. – – – indicates negative B power supply.
4. ▇ indicates signal path.
5. When replacing the parts in the darkned area ( ▒ ) and those marked with ⚠ , be sure to use the designated parts to ensure safety.
6. This is the standard circuit diagram. The design and contents are subject to change without notice.

The Table

| Point |
|---|
| 1-1 |
| 1-2 |
| 1-3 |
| 1-4 |
| 1-5 |
| 1-6 |
| 1-7 |
| 1-8 |
| 1-9 |
| 1-10 |
| 1-11 |
| 1-12 |
| 1-13 |
| 1-14 |
| 1-15 |
| 2-1 |
| 2-2 |
| 2-3 |
| 2-4 |
| 2-5 |
| 2-6 |
| 2-7 |
| 2-8 |
| 2-9 |
| 2-10 |
| 2-11 |
| 2-12 |
| 2-13 |
| 2-14 |
| 2-15 |
| 2-16 |
| 2-17 |
| 2-18 |
| 2-19 |
| 2-20 |
| 2-21 |
| 2-22 |
| 2-23 |
| 2-24 |
| 2-25 |
| 2-26 |
| 2-27 |
| 2-28 |
| 2-29 |
| 2-30 |
| 2-31 |
| 2-32 |
| 2-33 |
| 2-34 |
| 2-35 |
| 2-36 |
| 2-37 |
| 2-38 |
| 2-39 |
| 2-40 |
| 2-41 |
| 2-42 |
| 2-43 |
| 2-44 |
| 2-45 |
| 2-46 |
| 2-47 |
| 2-48 |
| 2-49 |


IC505 : NJM4560DD
IC506 : NJM4560DD
IC507 : M5218L
IC504 BU4053B
IC503 PCM53JP-V-2
IC601 YM3531
IC602
IC101
IC102
IC151
IC901
IC102 : M5218L
IC901 : M5218L
Q501 2SD1302(S,T)
Q502 2SD1302
Q503 2SD1302(S,T)
Q504 2SD1302(S,T)
Q601 2SD1302(S,T)
Q804 2SD1302(S,T)
Q901 2SD400MP (E,F)
Q902 2SB544MP(E,F)
Q931 2SD1302(S,T)
Q932 2SD400MP (E,F)
Q933 2SB544MP (E,F)
Q961 2SD1313V(D,E)
Q962 2SB507V (D,E)
Q101 2SD400MP (E,F)
Q102 2SB507VMP (D,E)
Q104 2SA1029
Q153 2SD1302(S,T)
Q154 2SD1313V (D,E)
Q155 2SB507V(D,E)
Q156 2SA1029 (C,D)
Q157 2SC458(C,D)
Q158 2SC458 (C,D)
Q507 2SA1029 (C,D)
BIT PLL
AUTO SLICER
SPINDLE SERVO
SLIDER SERVO
LOADING SERVO
STOPPER
ED
L ch
R ch
P501
P502
TO FRONT P.C.B
SPINDLE MOTOR
FEED MOTOR
LOADING MOTOR
M001
M002
M003
FW901
P901
P102
P154
P158
P159
ICP-F20x2
ECX086-436EC
8.6436MHz

## The Table for Voltage of Important Points

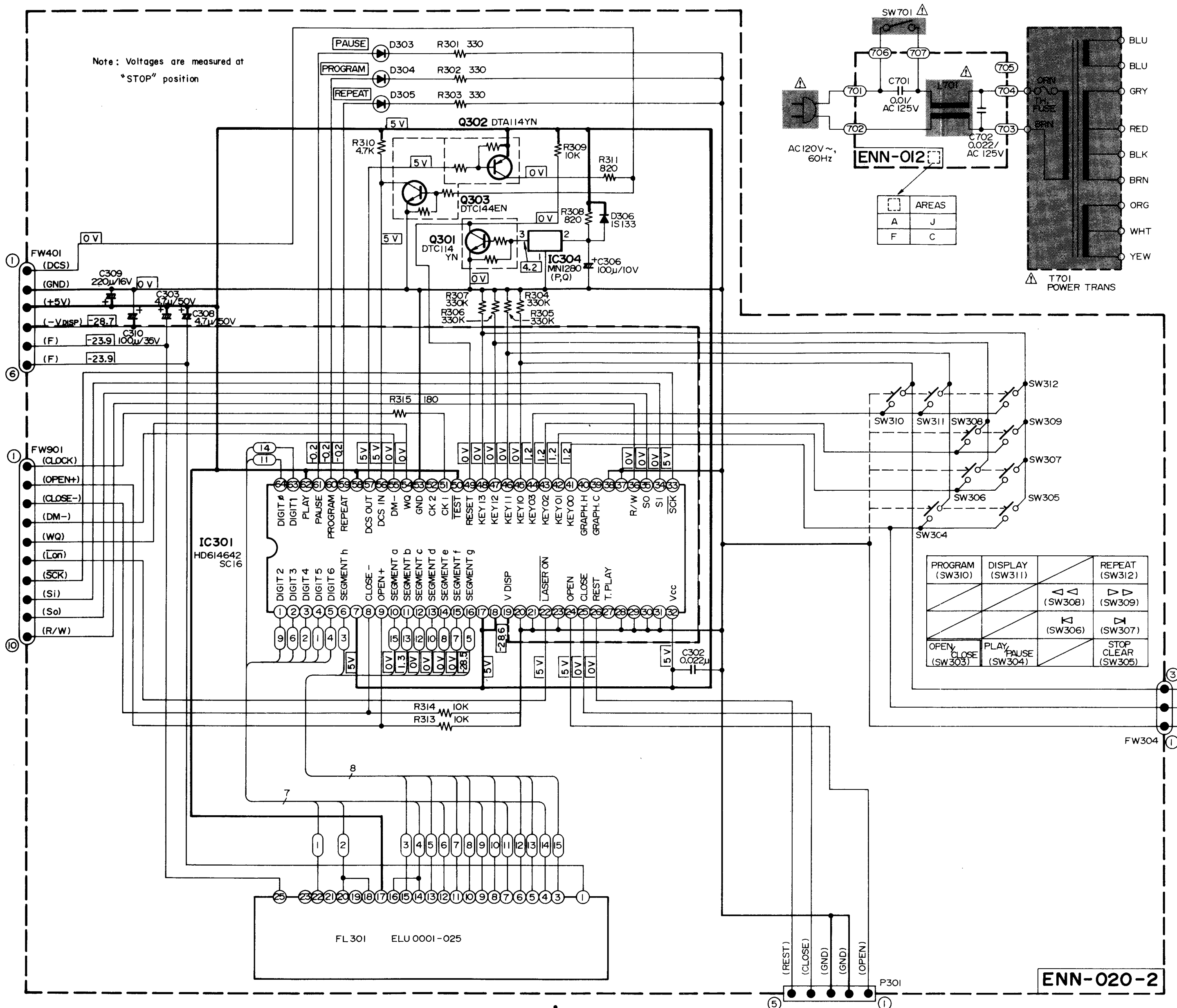
| Point | "STOP" mode | "PLAY" mode |
|---|---|---|
| 1-1 | 0 (V) | 0 (V) |
| 1-2 | 0 | — |
| 1-3 | 0 | — |
| 1-4 | 13.0 | 13.0 |
| 1-5 | -13.1 | -13.1 |
| 1-6 | 0 | — |
| 1-7 | 0 | — |
| 1-8 | 0 | 0 |
| 1-9 | 0.7 | — |
| 1-10 | 4.1 | 4.1 |
| 1-11 | 0 | 0 |
| 1-12 | 10.5 | 10.5 |
| 1-13 | 3.5 | 3.5 |
| 1-14 | 11.2 | 11.0 |
| 1-15 | 6.9 | 6.9 |
| 2-1 | 0.2 | 0.2 |
| 2-2 | 0.8 | 0.8 |
| 2-3 | -13.1 | -13.1 |
| 2-4 | 11.0 | 11.0 |
| 2-5 | 0.2 | 1.2 |
| 2-6 | 0.2 | 1.3 |
| 2-7 | 0.2 | 1.8 |
| 2-8 | 0.1 | 1.2 |
| 2-9 | 0.1 | 0.1 |
| 2-10 | 0 | 0.6 |
| 2-11 | 0 | 1.8 |
| 2-12 | 0.1 | 5.0 |
| 2-13 | 6.6 | 6.6 |
| 2-14 | 6.5 | 6.5 |
| 2-15 | 13.0 | 13.0 |
| 2-16 | 0 | 0 |
| 2-17 | 0.1 | 2.0 |
| 2-18 | 0 | 0 |
| 2-19 | 0.7 | 0.7 |
| 2-20 | 5.0 | 5.0 |
| 2-21 | 0 | 0 |
| 2-22 | -1.2 | -1.2 |
| 2-23 | 0 | 0 |
| 2-24 | 0 | 0 |
| 2-25 | 0 | 0 |
| 2-26 | 0 | 0 |
| 2-27 | 0 | 0 |
| 2-28 | 0 | 0 |
| 2-29 | 0.6 | (-1.3~) |
| 2-30 | 0 | (-0.8~) |
| 2-31 | 0 | 0 |
| 2-32 | 0 | 0 |
| 2-33 | 0 | 0 |
| 2-34 | 13.0 | 13.0 |
| 2-35 | -13.1 | -13.1 |
| 2-36 | 0 | 0 |
| 2-37 | 0 | 0 |
| 2-38 | 0 | 0 |
| 2-39 | 0 | 0 |
| 2-40 | 0.7 | (0.5~) |
| 2-41 | 0 | (0.5~) |
| 2-42 | 0 | (0.1~) |
| 2-43 | 11.6 | 11.5 |
| 2-44 | -12.7 | -11.8 |
| 2-45 | 0.6 | (-1.2~) |
| 2-46 | 0.6 | -1.2 |
| 2-47 | 0 | 0 |
| 2-48 | -1.2 | -1.2 |
| 2-49 | 0 | 0 |
| 2-50 | 0.6 (V) | 0.6 (V) |
| 2-51 | 5.0 | 5.0 |
| 2-52 | 5.0 | -1.2 |
| 2-53 | 4.4 | 0 |
| 2-54 | 2.2 | 4.9 |
| 2-55 | 0 | -0.1 |
| 2.56 | 0 | 0 |
| 2-57 | 0.6 | 0 |
| 2-58 | 0 | 0.1 |
| 2-59 | 0 | (0.1) |
| 2-60 | 0 | (0.1) |
| 2-61 | 0 | (1.1~1.9) |
| 2-62 | 0 | (0~1.7) |
| 2-63 | 11.7 | 11.5 |
| 2-64 | -12.9 | -11.8 |
| 2-65 | 0 | (0.9~1.1) |
| 2-66 | 0 | 0.1 |
| 2-67 | 0 | 0.1 |
| 2-68 | -0.6 | (1.5~1.6) |
| 2-69 | -0.6 | (1.5~1.6) |
| 2-70 | 0 | (0.9~1.0) |
| 2-71 | 11.8 | 11.4 |
| 2-72 | -12.9 | -11.7 |
| 2-73 | 0 | 0 |
| 2-74 | 0 | 0 |
| 2-75 | 13.0 | 13.0 |
| 2-76 | -13.1 | -13.1 |
| 2-77 | 0 | 0 |
| 2-78 | 0 | 0 |
| 2-79 | 0 | 0 |
| 2-80 | -12.9 | -11.7 |
| 2-81 | 11.7 | 11.4 |
| 2-82 | 11.7 | 11.3 |
| 2-83 | 11.5 | 11.2 |
| 2-84 | -8.6 | -8.7 |
| 2-85 | 11.6 | 11.2 |
| 2-86 | -13.1 | -13.1 |
| 2-87 | 11.6 | 11.2 |
| 2-88 | 2.1 | 2.5 |
| 2-89 | 2.1 | 2.5 |
| 2-90 | 2.1 | 2.1 |
| 2-91 | 0 | 0 |
| 2-92 | 0 | 0 |
| 2-93 | 0 | 0 |
| 2-94 | 0 | 0.7 |
| 2-95 | 0 | 0 |
| 2-96 | 0 | 0 |
| 2-97 | 2.5 | 2.5 |
| 2-98 | 2.5 | 2.5 |
| 2-99 | 0 | 0 |
| 2-100 | 0 | 0 |
| 2-101 | 5.6 | 5.6 |
| 3-1 | 5.0 | 5.0 |
| 3-2 | 0 | 0 |
| 3-3 | 0 | 0 |
| 3-4 | 5.0 | 5.0 |
| 3-5 | 6.3 | 6.3 |
| 3-6 | 13.0 | 13.0 |
| 3-7 | -13.1 | -13.1 |
| 3-8 | 5.0 | 5.0 |
| 3-9 | 0 | (—) |
| 3-10 | -13.1 | -13.1 |
| 3-11 | 4.7 | 4.7 |
| 3-12 | 0 | (—) |
| 3-13 | 0 (V) | 0 (V) |
| 3-14 | 0.1 | — |
| 3-15 | 0 | — |
| 3-16 | -7.1 | (-7.1)* |
| 3-17 | 0 | — |
| 3-18 | -7.1 | (-7.1)* |
| 3-19 | 0 | — |
| 3-20 | 0 | — |
| 3-21 | 13.0 | 13.0 |
| 3-22 | -13.1 | -13.1 |
| 3-23 | 0 | — |
| 3-24 | 0 | — |
| 3-25 | 0 | 0 |
| 3-26 | -0.1 | — |
| 3-27 | 0 | 0 |
| 3-28 | 0 | — |
| 3-29 | -0.1 | — |
| 3-30 | 0 | — |
| 3-31 | 0 | — |
| 3-32 | -8.7 | -8.7 |
| 3-33 | -8.7 | -8.7 |
| 3-34 | 0 | — |
| 3-35 | 0 | — |
| 3-36 | 0 | — |
| 3-37 | 0 | — |
| 3-38 | 0 | — |
| 3-39 | 0 | — |
| 4-1 | -13.1 | — |
| 4-2 | -21.9 | — |
| 4-3 | -44.3 | — |
| 4-4 | -27.5 | — |
| 4-5 | -27.7 | — |
| 4-6 | -26.9 | — |
| 4-7 | -43.8 | — |
| 4-8 | -23.9 | — |
| 4-9 | -23.9 | — |
| 4-10 | 11.7 | — |
| 4-11 | -12.1 | — |
| 4-12 | 5.0 | — |
| 4-13 | 21.0 | — |
| 4-14 | 13.0 | — |
| 4-15 | 13.7 | — |
| 4-16 | 13.6 | — |
| 4-17 | 13.6 | — |
| 4-18 | 13.1 | — |
| 4-19 | -21.3 | — |
| 4-20 | -13.1 | — |
| 4-21 | -13.6 | — |
| 4-22 | -13.6 | — |
| 4-23 | -13.1 | — |
| 4-24 | -13.5 | — |
| 4-25 | 0 | — |
| 4-26 | -12.8 | — |
| 4-27 | -12.8 | — |
| 4-28 | -12.8 | — |
| 4-29 | -12.8 | — |
| 4-30 | 0 | — |
| 4-31 | 5.0 | — |
| 4-32 | 4.9 | — |

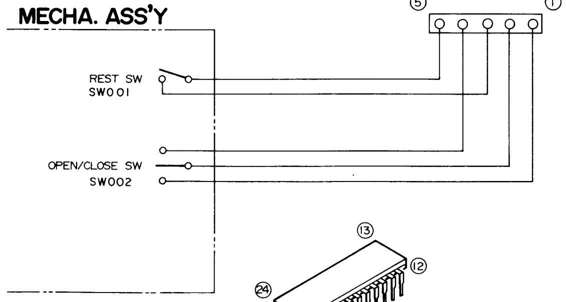
**Note**: * marked voltage is at "OFF" in de-emphasis.
At "ON" voltage is 2.2 V.

d area ( ▨ ) and
he designated parts

to change without

## 17-(2) XL-V200B Power & Supply Section


Note: Voltages are measured at "STOP" position
FW401
(DCS)
(GND)
(+5V)
(-VDSP)
(F)
(F)
FW901
(CLOCK)
(OPEN+)
(CLOSE-)
(DM-)
(WQ)
(Lon)
(SCK)
(SI)
(So)
(R/W)
PAUSE D303 R301 330
PROGRAM D304 R302 330
REPEAT D305 R303 330
Q302 DTA114YN
Q303 DTC144EN
Q301 DTC114YN
IC304 MN1280 (P,Q)
C306 100μ/10V
D306 1S133
R309 10K
R310 4.7K
R311 820
R308 820
R307 330K
R306 330K
R304 330K
R305 330K
C309 220μ/16V
C303 47μ/50V
C308 4.7μ/50V
C310 100μ/35V
-28.7
-23.9
R315 180
IC301 HD614642 SC16
C302 0.022μ
R314 10K
R313 10K
FL301 ELU0001-025
SW310 SW311 SW308 SW312 SW309 SW307 SW306 SW305 SW304
FW303 FW304 SW303
ENN-020-3
ENN-020-2


P301
(REST) (CLOSE) (GND) (GND) (OPEN)
MECHA. ASS'Y
REST SW SW001
OPEN/CLOSE SW SW002

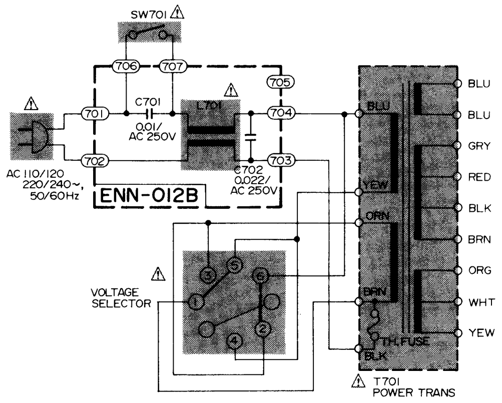
| PROGRAM (SW310) | DISPLAY (SW311) | | REPEAT (SW312) |
|---|---|---|---|
| | | ◁◁ (SW308) | ▷▷ (SW309) |
| | | ⏮ (SW306) | ⏭ (SW307) |
| OPEN/CLOSE (SW303) | PLAY/PAUSE (SW304) | | STOP CLEAR (SW305) |

### J & C (for U.S.A & Canada)

SW701
C701 0.01/AC 125V
L701
C702 0.022/AC 125V
AC120V~, 60Hz
ENN-012
T701 POWER TRANS
BLU BLU GRY RED BLK BRN ORG WHT YEW

| ☐ | AREAS |
|---|---|
| A | J |
| F | C |

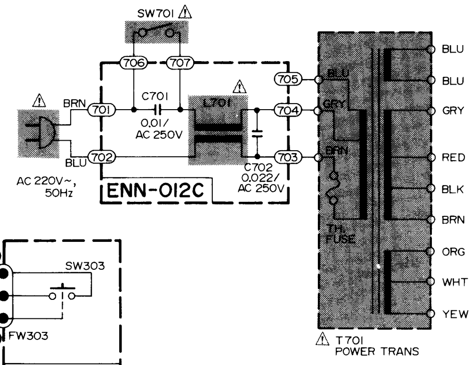
### P & U (for U.S.Military Market & Other Areas)


SW701
C701 0.01/AC 250V
L701
C702 0.022/AC 250V
AC 110/120 220/240~, 50/60Hz
ENN-012B
VOLTAGE SELECTOR
TH. FUSE
T701 POWER TRANS
BLU BLU GRY RED BLK BRN ORG WHT YEW

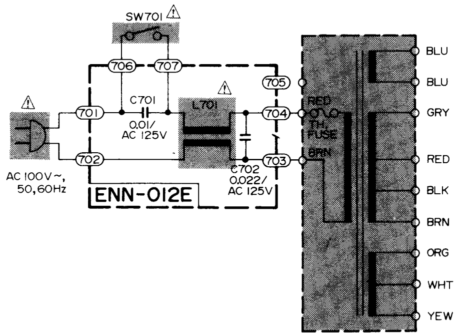
THIS CONNECTION IS 110V

| VOLTAGE | 110V | 120V | 220V | 240V |
|---|---|---|---|---|
| CONNECTION | 1-5, 2-6 | 1-4, 3-6 | 2-5 | 3-4 |

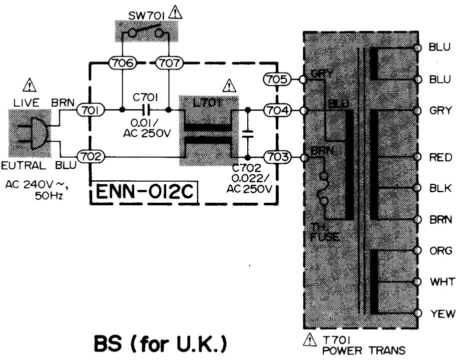
### E & G (for Continental Europe & W. Germany)


SW701
C701 0.01/AC 250V
L701
C702 0.022/AC 250V
AC 220V~, 50Hz
ENN-012C
TH. FUSE
T701 POWER TRANS
BLU BLU GRY RED BLK BRN ORG WHT YEW

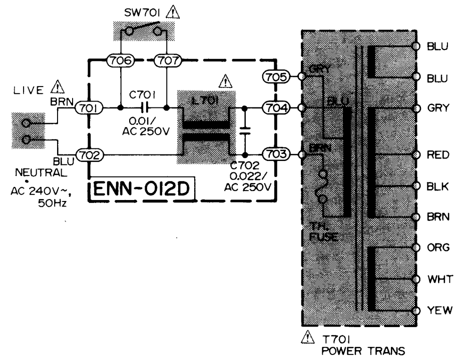
### D (for Domestic)

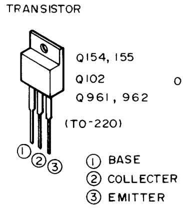

SW701
C701 0.01/AC 125V
L701
C702 0.022/AC 125V
AC 100V~, 50,60Hz
ENN-012E
TH. FUSE
T701 POWER TRANS
BLU BLU GRY RED BLK BRN ORG WHT YEW

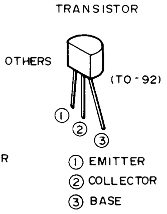
### A (for Australia)

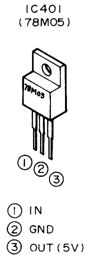

SW701
LIVE BRN
NEUTRAL BLU
C701 0.01/AC 250V
L701
C702 0.022/AC 250V
AC 240V~, 50Hz
ENN-012C
TH. FUSE
T701 POWER TRANS
BLU BLU GRY RED BLK BRN ORG WHT YEW

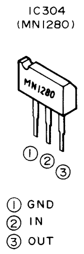
### BS (for U.K.)

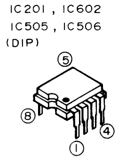

SW701
LIVE BRN
NEUTRAL BLU
C701 0.01/AC 250V
L701
C702 0.022/AC 250V
AC 240V~, 50Hz
ENN-012D
TH. FUSE
T701 POWER TRANS
BLU BLU GRY RED BLK BRN ORG WHT YEW

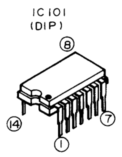

TRANSISTOR
Q154, 155
Q102
Q961, 962
(TO-220)
① BASE
② COLLECTER
③ EMITTER

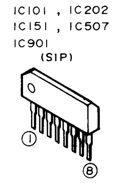

TRANSISTOR
OTHERS
(TO-92)
① EMITTER
② COLLECTOR
③ BASE

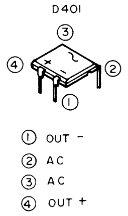

IC401 (78M05)
① IN
② GND
③ OUT (5V)

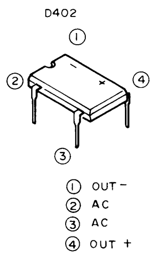

IC304 (MN1280)
① GND
② IN
③ OUT

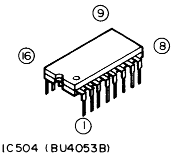

IC201, IC602
IC505, IC506
(DIP)

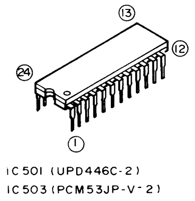


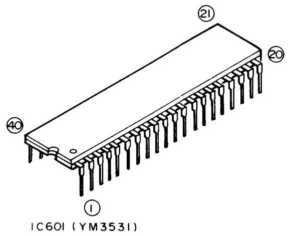

IC101, IC202
IC151, IC507
IC901
(SIP)

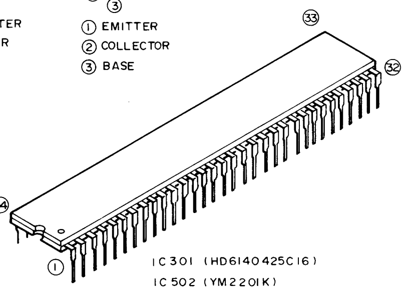

D401
① OUT -
② AC
③ AC
④ OUT +


D402
① OUT -
② AC
③ AC
④ OUT +


IC504 (BU4053B)


IC501 (UPD446C-2)
IC503 (PCM53JP-V-2)

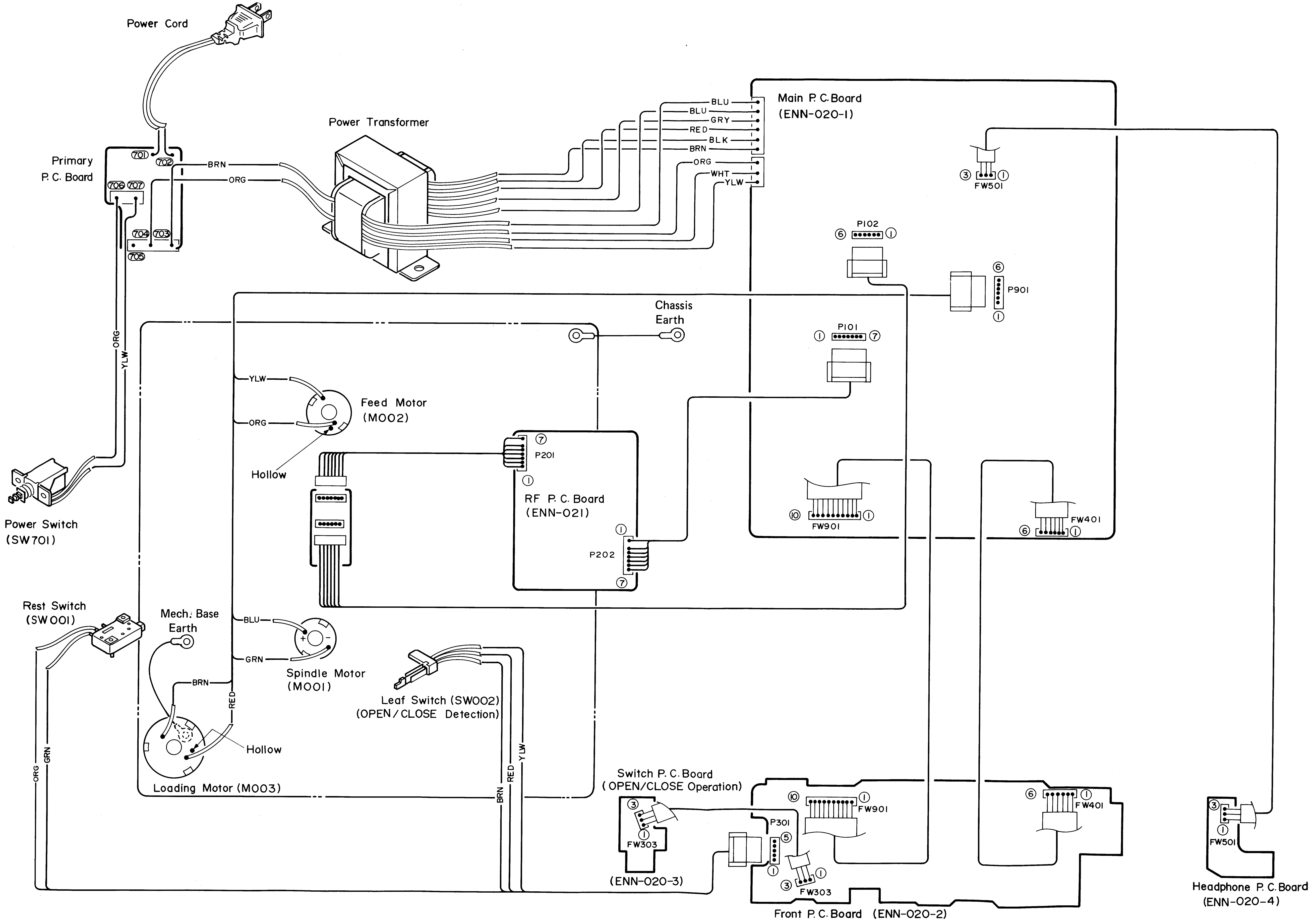

IC601 (YM3531)


IC301 (HD6140425C16)
IC502 (YM2201K)

**Notes:**

1. ▨ shows DC voltage to the chassis with no signal input.
2. ______ indicates positive B power supply.
3. ----- indicates negative B power supply.
4. ▨ indicates signal path.
5. When replacing the parts in the darkned area ( ▨ ) and those marked with ⚠, be sure to use the designatad parts to ensure safety.
6. This is the standard circuit diagram. The design and contents are subject to change without notice.

# 16. XL-V200B Connection Diagram


Power Cord
Primary
P. C. Board
701
702
706
707
704
703
705
BRN
ORG
Power Transformer
BLU
BLU
GRY
RED
BLK
BRN
ORG
WHT
YLW
Main P. C. Board
(ENN-020-1)
③
①
FW501
P102
⑥
①
⑥
P901
①
Chassis
Earth
P101
①
⑦
ORG
YLW
Power Switch
(SW701)
YLW
ORG
Feed Motor
(M002)
Hollow
⑦
P201
①
RF P. C. Board
(ENN-021)
①
P202
⑦
⑩
①
FW901
FW401
⑥
①
Rest Switch
(SW001)
Mech. Base
Earth
BLU
GRN
Spindle Motor
(M001)
BRN
RED
Leaf Switch (SW002)
(OPEN/CLOSE Detection)
Hollow
Loading Motor (M003)
ORG
GRN
BRN
RED
YLW
Switch P. C. Board
(OPEN/CLOSE Operation)
③
①
FW303
(ENN-020-3)
⑩
①
FW901
P301
⑤
①
③
①
FW303
⑥
①
FW401
Front P. C. Board (ENN-020-2)
③
①
FW501
Headphone P. C. Board
(ENN-020-4)

# PARTS LIST

## Contents

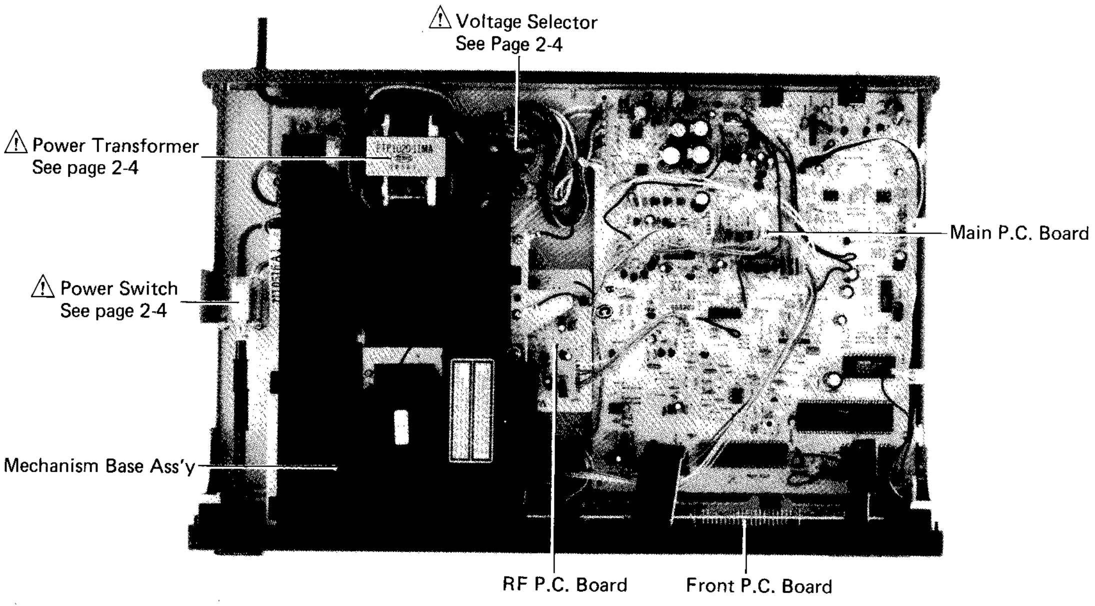
1. Main Parts Locations . . . . . . . . . . 2-2
2. Exploded View and Part Numbers . . . . . . . . . . 2-3
3. Mechanism Ass'y . . . . . . . . . . 2-5

4. Printed Circuit Board Ass'y and Parts List

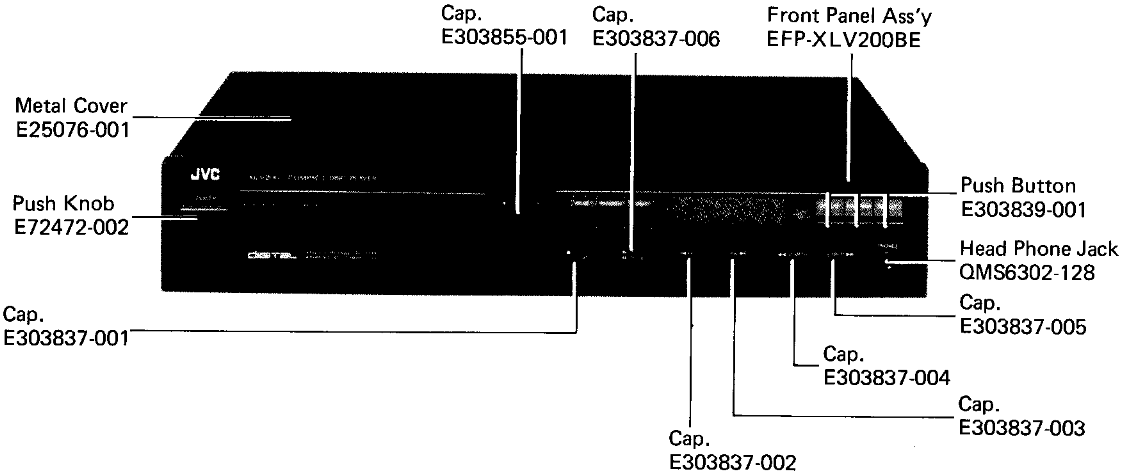
4-(1) ENN-020B Main P.C. Board Ass'y . . . . . . . . . . 2-7
4-(2) ENN-021A RF P.C. Board Ass'y . . . . . . . . . . 2-12
4-(3) ENN-012□Primary P.C. Board Ass'y . . . . . . . . . . 2-13
5. Packing Materials and Part Numbers . . . . . . . . . . 2-14
6. Accessories List . . . . . . . . . . 2-15

# 1. Main Parts Location

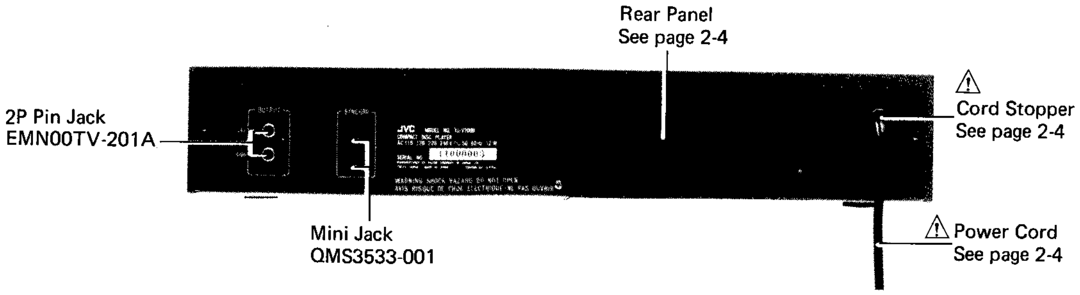
## 1-(1) Top View


⚠ Voltage Selector
See Page 2-4
⚠ Power Transformer
See page 2-4
Main P.C. Board
⚠ Power Switch
See page 2-4
Mechanism Base Ass'y
RF P.C. Board
Front P.C. Board

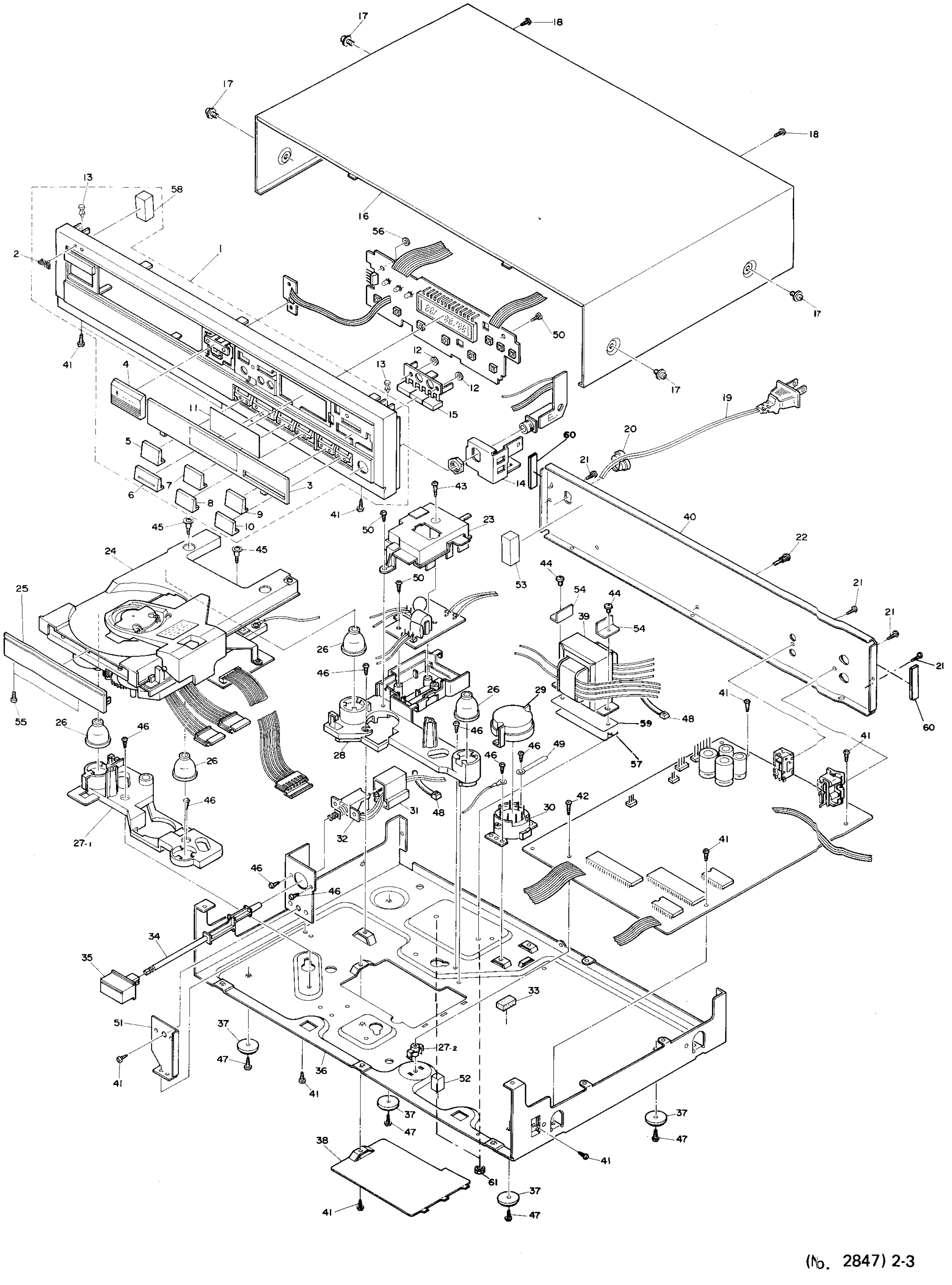
## 1-(2) Front View


Cap.
E303855-001
Cap.
E303837-006
Front Panel Ass'y
EFP-XLV200BE
Metal Cover
E25076-001
Push Knob
E72472-002
Push Button
E303839-001
Head Phone Jack
QMS6302-128
Cap.
E303837-001
Cap.
E303837-005
Cap.
E303837-004
Cap.
E303837-003
Cap.
E303837-002

## 1-(3) Rear View


Rear Panel
See page 2-4
2P Pin Jack
EMN00TV-201A
⚠ Cord Stopper
See page 2-4
Mini Jack
QMS3533-001
⚠ Power Cord
See page 2-4

# 2. Exploded View and Part Numbers


17
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27-1
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27-2
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37
41
47

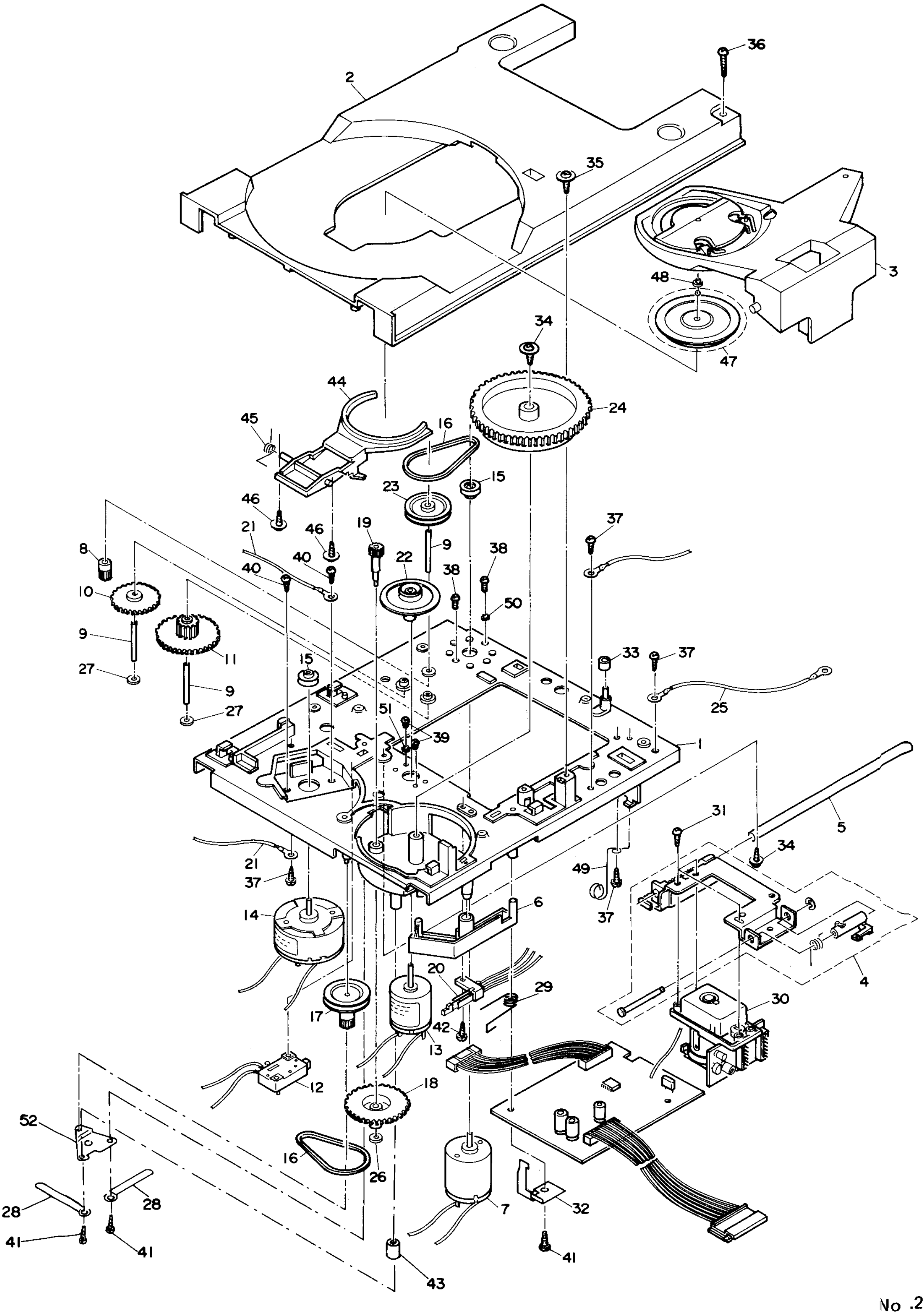
| ⚠ | Item | Part Number | Part Name | Q'ty | Description | Areas |
|---|---|---|---|---|---|---|
| | 1 | EFP-XLV200BE | Front Panel Ass'y | 1 | | |
| | 2 | E70913-001 | JVC Mark | 1 | | |
| | 3 | E303835-002 | Window Screen | 1 | | |
| | 4 | E303855-001 | Cap. | 1 | OPEN/CLOSE | |
| | 5 | E303837-001 | Cap. | 1 | STOP/CLEAR | |
| | 6 | E303837-006 | Cap. | 1 | PLAY/PAUSE | |
| | 7 | E303837-002 | Cap. | 1 | \|◀ SKIP | |
| | 8 | E303837-003 | Cap. | 1 | SKIP ▶\| | |
| | 9 | E303837-004 | Cap. | 1 | ◀◀SEARCH | |
| | 10 | E303837-005 | Cap. | 1 | SEARCH▶▶ | |
| | 11 | E70561-015 | FL. Screen | 1 | | |
| | 12 | E60912-003 | Speed Nut | 2 | | |
| | 13 | E48729-008 | Plastic Rivet | 2 | | |
| | 14 | E303840-001 | H.P. Bracket | 1 | Head Phone Jack | |
| | 15 | E303839-001 | Push Button | 1 | | |
| | 16 | E25076-001 | Metal Cover | 1 | | |
| | 17 | E61660-004 | Special Screw | 4 | | |
| | 18 | SHSB3008M | Screw | 2 | | |
| ⚠ | 19 | QMP1200-200 | Power Cord | 1 | | J, C |
| ⚠ | | QMP2560-244 | Power Cord | 1 | | A |
| ⚠ | | QMP3900-200 | Power Cord | 1 | | E, G, ES |
| ⚠ | | QMP7600-250 | Power Cord | 1 | | P, PG, U |
| ⚠ | | QMP9017-008BS | Power Cord | 1 | | BS |
| ⚠ | 20 | QHS3876-162 | Cord Stopper | 1 | | J, C, A, E, G, P, PG, ES, U |
| ⚠ | | QHS3876-162BS | Cord Stopper | 1 | | BS |
| | 21 | SBSE3008M | Screw | 4 | | |
| | 22 | E66052-001 | Special Screw | 1 | | |
| | 23 | E303842-001 | Cover | 1 | | P, PG, U, E, A, G, ES, BS |
| | | E303842-002 | Cover | 1 | | J, C |
| | 24 | E11169-001 | Mechanism Base Ass'y | 1 | | |
| | 25 | E303845-002 | Fitting | 1 | | |
| | 26 | E72393-001 | FL. Rubber | 4 | | |
| | 27-1 | E25081-001A | Stand | 1 | | |
| | 27-2 | E25081-001B | C.B. Holder | 1 | | |
| | 28 | E11157-001 | Stand | 1 | | P, PG, E, A, G, ES, BS, U |
| | | E11157-002 | Stand | 1 | | J, C |
| | 29 | E302764-001 | Cover | 1 | Voltage Selector | P, PG, U |
| ⚠ | 30 | QSR0085-008U | Voltage Selector | 1 | | P, PG, U |
| ⚠ | 31 | E71004-001 | Switch Cover | 1 | Power Switch | |
| ⚠ | 32 | QSP1106-004 | Push Switch | 1 | Power | J, C, P, PG, E, A, G, ES, U |
| ⚠ | | QSP1106-004BS | Push Switch | 1 | Power | BS |
| | 33 | E72572-002 | Felt Spacer | 1 | | |
| | 34 | E303854-001 | Push Shaft | 1 | Power | |
| | 35 | E72472-002 | Push Knob | 1 | Power | |
| | 36 | E11151-001 | Chassis Base | 1 | | J, C, E, A, G, BS, ES |
| | | E11151-002 | Chassis Base | 1 | | P, PG, U |
| | 37 | E47227-026 | Foot | 4 | | |
| | 38 | E303841-001 | Button Cover | 1 | | |
| ⚠ | 39 | ETP1020-11JA | Power Transformer | 1 | | J, C |
| ⚠ | | ETP1020-11MA | Power Transformer | 1 | | P, PG, U |
| ⚠ | | ETP1020-11EA | Power Transformer | 1 | | E, A, G, ES |
| ⚠ | | ETP1020-11EABS | Power Transformer | 1 | | BS |
| | 40 | E25078-001 | Rear Panel | 1 | | J |
| | | E25078-003 | Rear Panel | 1 | | C,P,PG,E,A,G,ES,BS,U |
| | 41 | SBSE3008N | Screw | 10 | | |
| | 42 | SBSE3012Z | Screw | 1 | | |
| | 43 | SBSF3014Z | Screw | 1 | | |
| | 44 | E65389-002 | Screw | 2 | | |
| | 45 | E72404-001 | Special Screw | 2 | | |
| | 46 | SBST3006Z | Screw | 8 | | |
| | 47 | SDSB3008N | Screw | 4 | | |
| | 48 | E33754-001 | Tie Band | 2 | | |
| | 49 | E72018-001 | Wire Clamp | 1 | | |
| | 50 | SBSF3008Z | Screw | 3 | | |
| | 51 | E72576-001 | Bracket | 1 | | |
| | 52 | E72572-003 | Spacer | 1 | | |
| | 53 | E72572-004 | Spacer | 1 | | |
| | 54 | E72606-001 | Bracket | 2 | For Power Transformer | |
| | 55 | SPSF2606Z | Screw | 2 | | |
| | 56 | E60912-004 | Speed Nut | 1 | | |
| | 57 | E72265-001 | Sheet | 1 | | |
| | 58 | E3400-368 | Felt Spacer | 1 | | |
| | 59 | E72265-003 | Sheet | 1 | | |
| | 60 | E72572-005 | Spacer | 2 | | |
| | 61 | NTS4000Z | Nut | 2 | | |

**The Marks for Designated Area**

| | | | | | |
|---|---|---|---|---|---|
| J | U.S.A. | E | Europe | BS | U.K. |
| C | Canada | G | West Germany | P, PG | U.S. Military Market |
| A | Australia | ES | Spain | U | Other Countries |

No Mark indicates all areas.

# 3. Mechanism Ass'y


36
2
35
3
48
34
47
44
24
45
16
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46
21
46
19
9
37
38
8
40
22
40
38
10
50
9
11
33
37
27
15
9
25
27
51
39
1
5
31
21
34
37
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4
20
29
30
17
42
13
12
18
52
16
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32
41
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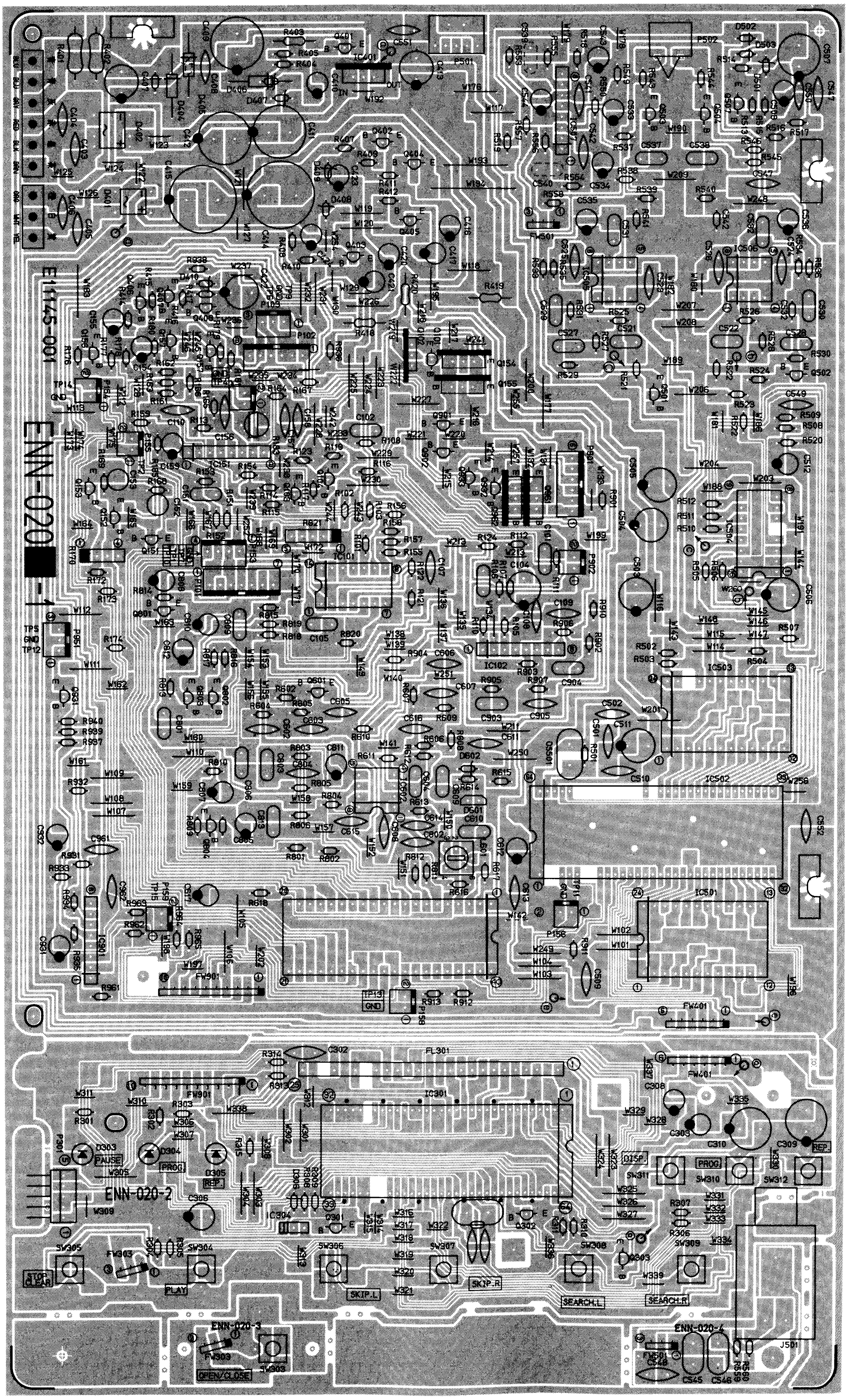
41
43

| ⚠ | Item | Part Number | Part Name | Q'ty | Description | Areas |
|---|---|---|---|---|---|---|
|  | 1 | E11148-002 | Base Ass'y | 1 |  |  |
|  | 2 | E11149-001 | Tray | 1 |  |  |
|  | 3 | E25068-001 | Holder | 1 |  |  |
|  | 4 | E72410-002 | Pick Up Base Unit | 1 |  |  |
|  | 5 | E71742-001 | Feed Shaft | 1 |  |  |
|  | 6 | E303831-001 | Lever | 1 |  |  |
|  | 7 | RF-260T-08450 | Motor | 1 |  |  |
|  | 8 | E71733-001 | Feed Gear (A) | 1 |  |  |
|  | 9 | E71731-002 | Shaft | 3 |  |  |
|  | 10 | E71734-001 | Feed Gear (B) | 1 |  |  |
|  | 11 | E303542-001 | Feed Gear (C) | 1 |  |  |
|  | 12 | QSS1214-002 | Slide Push Switch | 1 |  |  |
|  | 13 | VA612R53 | Motor | 1 |  |  |
|  | 14 | E71569-001 | Motor | 1 |  |  |
|  | 15 | E72376-001 | M. Pulley | 2 |  |  |
|  | 16 | E69879-002 | Belt | 2 |  |  |
|  | 17 | E72375-001 | Pulley (A) | 1 |  |  |
|  | 18 | E72377-001 | Gear (Y) | 1 |  |  |
|  | 19 | E72378-001 | Gear (X) | 1 |  |  |
|  | 20 | ESB1200-001 | Leaf Switch | 1 |  |  |
|  | 21 | EWT021-017 | Terminal Wire Ass'y | 1 |  |  |
|  | 22 | E72379-001 | Turn Table | 1 |  |  |
|  | 23 | E72392-001 | Pulley (B) | 1 |  |  |
|  | 24 | E25064-001 | Main Gear | 1 |  |  |
|  | 25 | EWT021-018 | Terminal Wire Ass'y | 1 |  |  |
|  | 26 | E60912-001 | Speed Nut | 1 |  |  |
|  | 27 | E72024-001 | Speed Nut | 2 |  |  |
|  | 28 | E50670-005 | Wire Clamp | 2 |  |  |
|  | 29 | E72382-001 | Tor Spring | 1 |  |  |
|  | 30 | E303991-001 | Laser Pick Up Ass'y | 1 |  |  |
|  | 31 | SPSP2605N | Screw | 3 |  |  |
|  | 32 | E72586-001 | Spacer | 1 |  |  |
|  | 33 | E70267-002 | R. Tube | 1 |  |  |
|  | 34 | E65923-003 | Screw | 2 |  |  |
|  | 35 | E65923-004 | Screw | 1 |  |  |
|  | 36 | SBSF3014Z | Screw | 1 |  |  |
|  | 37 | SBSE3008N | Screw | 4 |  |  |
|  | 38 | SPSP2608N | Screw | 2 |  |  |
|  | 39 | SDSP2003N | Screw | 2 |  |  |
|  | 40 | SDSP2604N | Screw | 2 |  |  |
|  | 41 | SBSF3008Z | Screw | 3 |  |  |
|  | 42 | SPSF2608Z | Screw | 1 |  |  |
|  | 43 | E72630-001 | Tube Spacer | 1 |  |  |
|  | 44 | E303832-001 | Lifter | 1 |  |  |
|  | 45 | E72381-001 | Spring | 1 |  |  |
|  | 46 | E72405-001 | Special Screw | 2 |  |  |
|  | 47 | E72380-002 | Clamper Ass'y | 1 |  |  |
|  | 48 | E72408-001 | Spacer | 1 |  |  |
|  | 49 | E72562-001 | Wire Holder | 1 |  |  |
|  | 50 | WBS2600N | Washer | 1 |  |  |
|  | 51 | WBS2000N | Washer | 1 |  |  |
|  | 52 | E72624-001 | Gear Bracket | 1 |  |  |

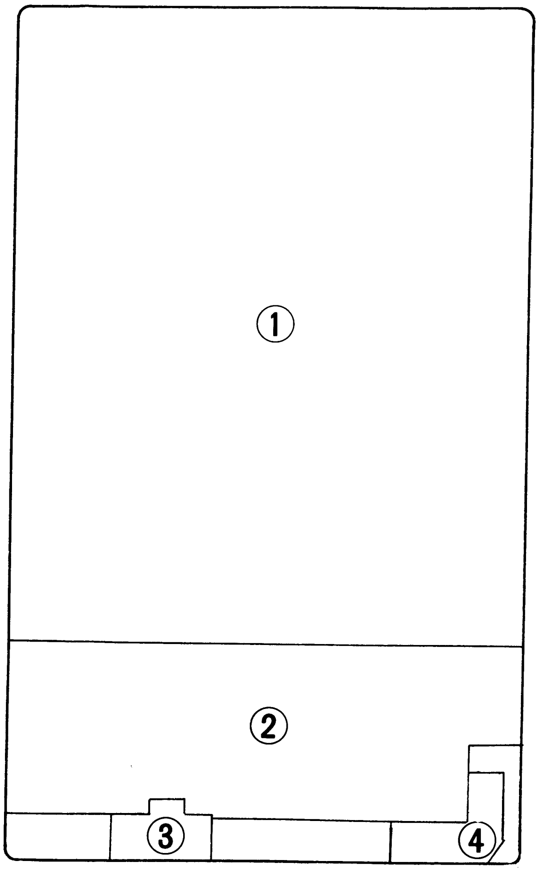
# 4. Printed Circuit Board Ass'y and Parts List

## 4-(1) ENN-020B Main P.C. Board Ass'y


E11145-001
ENN-020■-1
ENN-020-2
ENN-020-3
ENN-020-4
IC301
IC501
IC502
IC503
FL301
PAUSE
PROG
REP
STOP CLEAR
PLAY
SKIP.L
SKIP.R
SEARCH.L
SEARCH.R
DISP
OPEN/CLOSE
TP13 GND
J501

**NOTE:** Printing errors regarding transistor polarity displays on PC boards.
On certain types of PC boards, polarity displays (emitter and base) on Q101, Q102, Q154, and Q155 are erroneously indicated. During components replacement, please refer to the PC board diagram on this page.

## Each Individual P.C. Board Location



① ENN-020-1
Main P.C. Board

② ENN-020-2
Front P.C. Board

③ ENN-020-3
Switch P.C. Board

④ ENN-020-4
Head Phone P.C. Board

**Transistors**

| ⚠ | Item | Part Number | Description | | Areas |
|---|---|---|---|---|---|
| | | | | Maker | |
| | Q101 | 2SD400MP(E,F) | Silicon | Sanyo | |
| | Q102 | 2SB507V(D,E) | Silicon | Sanyo | |
| | Q103 | 2SD1302(S,T) | Silicon | Matsushita | |
| | Q104 | 2SA1029(C,D) | Silicon | Hitachi | |
| | Q151 | 2SD1302(S,T) | Silicon | Matsushita | |
| | Q152 | 2SD1302(S,T) | Silicon | Matsushita | |
| | Q153 | 2SD1302(S,T) | Silicon | Matsushita | |
| | Q154 | 2SD313V(D,E) | Silicon | Sanyo | |
| | Q155 | 2SB507V(D,E) | Silicon | Sanyo | |
| | Q156 | 2SA1029(C,D) | Silicon | Hitachi | |
| | Q157 | 2SC458(C,D) | Silicon | Hitachi | |
| | Q158 | 2SC458(C,D) | Silicon | Hitachi | |
| | Q301 | DTC114YN | Silicon | Rohm | |
| | Q302 | DTA114YN | Silicon | Rohm | |
| | Q303 | DTC144EN | Silicon | Rohm | |
| | Q401 | 2SA733A(P,Q) | Silicon | NEC | |
| | Q402 | 2SD400MP(E,F) | Silicon | Sanyo | |
| | Q403 | 2SB544MP(E,F) | Silicon | Sanyo | |
| | Q404 | 2SD400MP(E,F) | Silicon | Sanyo | |
| | Q405 | 2SB544MP(E,F) | Silicon | Sanyo | |
| | Q406 | 2SA1029(C,D) | Silicon | Hitachi | |
| | Q407 | 2SA1029(C,D) | Silicon | Hitachi | |
| | Q408 | 2SD400MP(E,F) | Silicon | Sanyo | |
| | Q501 | 2SD1302(S,T) | Silicon | Matsushita | |
| | Q502 | 2SD1302(S,T) | Silicon | Matsushita | |
| | Q503 | 2SD1302(S,T) | Silicon | Matsushita | |
| | Q504 | 2SD1302(S,T) | Silicon | Matsushita | |
| | Q507 | 2SA1029(C,D) | Silicon | Hitachi | |
| | Q601 | 2SD1302(S,T) | Silicon | Matsushita | |
| | Q801 | 2SA1029(C,D) | Silicon | Hitachi | |
| | Q802 | 2SC458(C,D) | Silicon | Hitachi | |
| | Q803 | 2SC458(C,D) | Silicon | Hitachi | |
| | Q804 | 2SD1302(S,T) | Silicon | Matsushita | |
| | Q901 | 2SD400MP(E,F) | Silicon | Sanyo | |
| | Q902 | 2SB544MP(E,F) | Silicon | Sanyo | |
| | Q931 | 2SD1302(S,T) | Silicon | Matsushita | |
| | Q932 | 2SD400MP(E,F) | Silicon | Sanyo | |
| | Q933 | 2SB544MP(E,F) | Silicon | Sanyo | |
| | Q961 | 2SD313V(D,E) | Silicon | Sanyo | |
| | Q962 | 2SB507V(D,E) | Silicon | Sanyo | |

**ICs**

| ⚠ | Item | Part Number | Description | | Areas |
|---|---|---|---|---|---|
| | | | | Maker | |
| | IC101 | NJM2901N | I.C. | JRC | |
| | IC102 | M5218L | I.C. | Mitsubishi | |
| | IC151 | M5218L | I.C. | Mitsubishi | |
| | IC301 | HD614042SC16 | I.C. | Hitachi | |
| | IC304 | MN1280(P,Q) | I.C. | Matsushita | |
| | IC401 | NJM78M05 | I.C. | JRC | |
| | IC501 | UPD446C-2 | I.C. | NEC | |
| | IC502 | YM2201-K | I.C. | Yamaha | |
| | IC503 | PCM53JP-V-2 | I.C. | Burr Brown | |
| | IC504 | BU4053B | I.C. | Rohm | |
| | IC505 | NJM4560D-X | I.C. | JRC | |
| | IC506 | NJM4560D-X | I.C. | JRC | |
| | IC507 | M5218L | I.C. | Mitsubishi | |
| | IC601 | YM3531 | I.C. | Yamaha | |
| | IC602 | M5219P | I.C. | Mitsubishi | |
| | IC901 | M5218L | I.C. | Mitsubishi | |

**Diodes**

| ⚠ | Item | Part Number | Description | | Areas |
|---|---|---|---|---|---|
| | | | | Maker | |
| | D303 | SLR-34VC50F | L.E.D. | Rohm | |
| | D304 | SLR-34VC50F | L.E.D. | Rohm | |
| | D305 | SLR-34VC50F | L.E.D. | Rohm | |
| | D306 | 1SS133 | Silicon | Rohm | |
| | D401 | S1WB(A)20 | Silicon | Sindengen | |
| | D402 | 1D4B42 | Silicon | Toshiba | |
| | D404 | 10E2FD-1 | Silicon | Nippon Inter | |
| | D405 | 10E2FD-1 | Silicon | Nippon Inter | |
| | D406 | 10E2FD-1 | Silicon | Nippon Inter | |
| | D407 | MTZ30A | Zener | Rohm | |
| | D408 | MTZ13C | Zener | Rohm | |
| | D409 | MTZ13C | Zener | Rohm | |
| | D410 | MTZ8.2C | Zener | Rohm | |
| | D501 | 1SS133 | Silicon | Rohm | |
| | D502 | 1SS133 | Silicon | Rohm | |
| | D601 | SVC321SP-AW | Zener | Sanyo | |
| | D602 | MTZ5.6C | Zener | Rohm | |

**Capacitors**

| ⚠ | Item | Part Number | Description | | | Areas |
|---|---|---|---|---|---|---|
| | C101 | QFN81HJ-104 | 0.1MF | 50V | Mylar | |
| | C102 | QFN81HJ-273 | 0.027MF | 50V | Mylar | |
| | C104 | QEK60JM-476 | 47MF | 6.3V | Electro | |
| | C105 | QFN81HJ-473 | 0.047MF | 50V | Mylar | |
| | C106 | QCS21HJ-471 | 470PF | 50V | Ceramic | |
| | C107 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C108 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C109 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C110 | QCS21HJ-101 | 100PF | 50V | Ceramic | |
| | C151 | QFN81HJ-273 | 0.027MF | 50V | Mylar | |
| | C152 | QEN51HM-105 | 1MF | 50V | Electro | |
| | C153 | QFN81HJ-273 | 0.027MF | 50V | Mylar | |
| | C154 | QETB0JM-227 | 220MF | 6.3V | Electro | |
| | C155 | QETB1HM-474 | 0.47MF | 50V | Electro | |
| | C156 | QCS21HJ-100 | 10PF | 50V | Ceramic | |
| | C157 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C158 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C302 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C303 | QETB1HM-475 | 4.7MF | 50V | Electro | |
| | C306 | QETB1AM-107 | 100MF | 10V | Electro | |
| | C308 | QETB1HM-475 | 3.7MF | 50V | Electro | |
| | C309 | QEU51CM-227 | 220MF | 16V | Electro | |
| | C310 | QEU51VM-107 | 100MF | 35V | Electro | |
| | C403 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C404 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C405 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C406 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C407 | QETB1HM-477 | 470MF | 50V | Electro | |
| | C408 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C409 | QETB1HM-477 | 470MF | 50V | Electro | |
| | C410 | QETB1HM-475 | 4.7MF | 50V | Electro | |
| | C411 | QETB1CM-228 | 2200MF | 16V | Electro | |
| | C412 | QETB1CM-228 | 2200MF | 16V | Electro | |
| | C413 | QETB1AM-107 | 100MF | 10V | Electro | |
| | C414 | QETB1EM-228 | 2200MF | 25V | Electro | |
| | C415 | QETB1EM-228 | 2200MF | 25V | Electro | |
| | C416 | QETB1CM-476 | 47MF | 16V | Electro | |
| | C417 | QETB1CM-476 | 47MF | 16V | Electro | |
| | C420 | QETB1CM-476 | 47MF | 16V | Electro | |
| | C421 | QETB1CM-476 | 47MF | 16V | Electro | |
| | C423 | QETB1EM-476 | 47MF | 25V | Electro | |
| | C424 | QETB1EM-476 | 47MF | 25V | Electro | |
| | C501 | QCS21HJ-100 | 10PF | 50V | Ceramic | |

**Capacitors**

| ⚠ | Item | Part Number | Description | | | Areas |
|---|---|---|---|---|---|---|
| | C502 | QCS21HJ-100 | 10PF | 50V | Ceramic | |
| | C503 | QETB0JM-227 | 220MF | 6.3V | Electro | |
| | C504 | QETB1CM-227 | 220MF | 16V | Electro | |
| | C505 | QETB1CM-227 | 220MF | 16V | Electro | |
| | C506 | QETB0JM-227 | 220MF | 6.3V | Electro | |
| | C507 | QETB1CM-227 | 220MF | 16V | Electro | |
| | C508 | QETB1CM-476 | 47MF | 16V | Electro | |
| | C509 | QCF21HP-473 | 0.047MF | 50V | Ceramic | |
| | C510 | QCF21HP-473 | 0.047MF | 50V | Ceramic | |
| | C511 | QETB1CM-477 | 470MF | 16V | Electro | |
| | C512 | QETB1CM-227 | 220MF | 16V | Electro | |
| | C521 | QFP81HJ-271 | 270PF | 50V | Poly | |
| | C522 | QFP81HJ-271 | 270PF | 50V | Poly | |
| | C523 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C524 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C525 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C526 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C527 | QFN81HJ-473 | 0.047MF | 50V | Mylar | |
| | C528 | QFN81HJ-473 | 0.047MF | 50V | Mylar | |
| | C529 | QFN81HJ-123 | 0.012MF | 50V | Mylar | |
| | C530 | QFN81HJ-123 | 0.012MF | 50V | Mylar | |
| | C531 | QFP81HJ-271 | 270PF | 50V | Poly | |
| | C532 | QFP81HJ-271 | 270PF | 50V | Poly | |
| | C533 | QETB1HM-105 | 1MF | 50V | Electro | |
| | C534 | QETB1HM-105 | 1MF | 50V | Electro | |
| | C535 | QETB1EM-226 | 22MF | 25V | Electro | |
| | C536 | QETB1EM-226 | 22MF | 25V | Electro | |
| | C537 | QFN81HJ-822 | 8200PF | 50V | Mylar | |
| | C538 | QFN81HJ-822 | 8200PF | 50V | Mylar | |
| | C543 | QETB1EM-226 | 22MF | 25V | Electro | |
| | C544 | QETB1EM-226 | 22MF | 25V | Electro | |
| | C545 | QFN81HJ-103 | 0.01MF | 50V | Mylar | |
| | C546 | QFN81HJ-103 | 0.01MF | 50V | Mylar | |
| | C547 | QCF21HP-103 | 0.01MF | 50V | Ceramic | |
| | C548 | QCF21HP-103 | 0.01MF | 50V | Ceramic | |
| | C549 | QCF21HP-103 | 0.01MF | 50V | Ceramic | |
| | C550 | QCF21HP-103 | 0.01MF | 50V | Ceramic | |
| | C551 | QCS21HJ-470 | 47PF | 50V | Ceramic | |
| | C552 | QCC21EM-473 | 0.047MF | 25V | Ceramic | |
| | C553 | QCF21HP-103 | 0.01MF | 50V | Ceramic | |
| | C602 | QFN81HJ-103 | 0.01MF | 50V | Mylar | |
| | C603 | QFV81HJ-224 | 0.22MF | 50V | T. Film | |
| | C604 | QFN81HJ-273 | 0.027MF | 50V | Mylar | |
| | C605 | QCS21HJ-471 | 470PF | 50V | Ceramic | |
| | C606 | QCS21HJ-471 | 470PF | 50V | Ceramic | |
| | C607 | QCF21HP-473 | 0.047MF | 50V | Ceramic | |
| | C608 | QCS21HJ-100 | 10PF | 50V | Ceramic | |
| | C609 | QFP81HJ-471 | 470PF | 50V | Poly | |
| | C610 | QFP81HJ-151 | 150PF | 50V | Poly | |
| | C611 | QCF21HP-473 | 0.047MF | 50V | Ceramic | |
| | C612 | QETB1CM-476 | 47MF | 16V | Electro | |
| | C613 | QCF21HP-473 | 0.047MF | 50V | Ceramic | |
| | C614 | QCF21HP-473 | 0.047MF | 50V | Ceramic | |
| | C615 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C616 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C617 | QETB1HM-474 | 0.47MF | 50V | Electro | |
| | C801 | QFV81HJ-224 | 0.22MF | 50V | T. Film | |
| | C802 | QCS21HJ-151 | 150PF | 50V | Ceramic | |
| | C803 | QFN81HJ-103 | 0.01MF | 50V | Mylar | |
| | C804 | QFN81HJ-152 | 1500PF | 50V | Mylar | |
| | C805 | QETB1HM-475 | 4.7MF | 50V | Electro | |
| | C806 | QFN81HJ-562 | 5600PF | 50V | Mylar | |

**Capacitors**

| ⚠ | Item | Part Number | Description | | | Areas |
|---|---|---|---|---|---|---|
| | C807 | QETB1EM-106 | 10MF | 25V | Electro | |
| | C808 | QETB1EM-106 | 10MF | 25V | Electro | |
| | C809 | QFN81HJ-473 | 0.047MF | 50V | Mylar | |
| | C810 | QETB1EM-106 | 10MF | 25V | Electro | |
| | C811 | QETB1EM-106 | 10MF | 25V | Electro | |
| | C812 | QETB1CM-107 | 100MF | 16V | Electro | |
| | C813 | QFN81HJ-473 | 0.047MF | 50V | Mylar | |
| | C903 | QFN81HJ-103 | 0.01MF | 50V | Mylar | |
| | C904 | QFV81HJ-224 | 0.22MF | 50V | T. Film | |
| | C905 | QCS21HJ-820 | 82PF | 50V | Ceramic | |
| | C931 | QETB1HM-475 | 4.7MF | 50V | Electro | |
| | C932 | QETB0JM-227 | 220MF | 6.3V | Electro | |
| | C961 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |
| | C962 | QCF21HP-223 | 0.022MF | 50V | Ceramic | |

**Resistors**

| ⚠ | Item | Part Number | Description | | | Areas |
|---|---|---|---|---|---|---|
| | R101 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R102 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R103 | QRD161J-104 | 100K | 1/6W | Carbon | |
| | R105 | QRD161J-183 | 18K | 1/6W | Carbon | |
| | R106 | QRD161J-471 | 470 | 1/6W | Carbon | |
| | R107 | QRD161J-183 | 18K | 1/6W | Carbon | |
| | R108 | QRD161J-183 | 18K | 1/6W | Carbon | |
| | R110 | QRD161J-470 | 47 | 1/6W | Carbon | |
| | R111 | QRD161J-154 | 150K | 1/6W | Carbon | |
| | R112 | QRD161J-274 | 270K | 1/6W | Carbon | |
| | R113 | QRD161J-155 | 1.5M | 1/6W | Carbon | |
| | R114 | QRD161J-102 | 1K | 1/6W | Carbon | |
| | R115 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R116 | QRD161J-104 | 100K | 1/6W | Carbon | |
| | R117 | QRD161J-272 | 2.7K | 1/6W | Carbon | |
| | R119 | QRD161J-470 | 47 | 1/6W | Carbon | |
| | R121 | QRD161J-104 | 100K | 1/6W | Carbon | |
| | R122 | QRD161J-472 | 4.7K | 1/6W | Carbon | |
| | R123 | QRD161J-473 | 47K | 1/6W | Carbon | |
| | R124 | QRD161J-155 | 1.5M | 1/6W | Carbon | |
| | R130 | QRD161J-114 | 110K | 1/6W | Carbon | |
| | R151 | QRD161J-821 | 820 | 1/6W | Carbon | |
| | R152 | QRD161J-223 | 22K | 1/6W | Carbon | |
| | R153 | QRD161J-153 | 15K | 1/6W | Carbon | |
| | R154 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R155 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R156 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R157 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R158 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R159 | QRD161J-223 | 22K | 1/6W | Carbon | |
| | R161 | QRD161J-223 | 22K | 1/6W | Carbon | |
| | R162 | QRD161J-334 | 330K | 1/6W | Carbon | |
| | R163 | QRD161J-334 | 330K | 1/6W | Carbon | |
| | R164 | QRD161J-332 | 3.3K | 1/6W | Carbon | |
| | R165 | QRD161J-184 | 180K | 1/6W | Carbon | |
| | R166 | QRD161J-203 | 20K | 1/6W | Carbon | |
| | R167 | QRD161J-470 | 47 | 1/6W | Carbon | |
| | R168 | QRD161J-182 | 1.8K | 1/6W | Carbon | |
| | R169 | QRD161J-182 | 1.8K | 1/6W | Carbon | |
| | R170 | QRB035J-104 | 100K | 3W | Carbon | |
| | R172 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R173 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R174 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R176 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R177 | QRD161J-104 | 100K | 1/6W | Carbon | |
| | R178 | QRD161J-104 | 100K | 1/6W | Carbon | |

**Resistors**

| ⚠ | Item | Part Number | Description | | | Areas |
|---|---|---|---|---|---|---|
| | R179 | QRD161J-122 | 1.2K | 1/6W | Carbon | |
| | R180 | QRD161J-392 | 3.9K | 1/6W | Carbon | |
| | R181 | QRD161J-182 | 1.8K | 1/6W | Carbon | |
| | R183 | QVP4A0B-472 | | | Variable | |
| | R301 | QRD161J-561 | 560 | 1/6W | Carbon | |
| | R302 | QRD161J-561 | 560 | 1/6W | Carbon | |
| | R303 | QRD161J-561 | 560 | 1/6W | Carbon | |
| | R304 | QRD161J-334 | 330K | 1/6W | Carbon | |
| | R305 | QRD161J-334 | 330K | 1/6W | Carbon | |
| | R306 | QRD161J-334 | 330K | 1/6W | Carbon | |
| | R307 | QRD161J-334 | 330K | 1/6W | Carbon | |
| | R308 | QRD161J-821 | 820 | 1/6W | Carbon | |
| | R309 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R310 | QRD161J-472 | 4.7K | 1/6W | Carbon | |
| | R311 | QRD161J-821 | 820 | 1/6W | Carbon | |
| | R313 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R314 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R315 | QRD161J-181 | 180 | 1/6W | Carbon | |
| | R401 | QRD125J-102 | 1K | 1/2W | Carbon | |
| | R402 | QRD125J-102 | 1K | 1/2W | Carbon | |
| ⚠ | R403 | QRZ0062-560 | 56 | | Fusible | |
| | R404 | QRD161J-123 | 12K | 1/6W | Carbon | |
| | R405 | QRD161J-121 | 120 | 1/6W | Carbon | |
| | R407 | QRD161J-122 | 1.2K | 1/6W | Carbon | |
| | R408 | QRD161J-122 | 1.2K | 1/6W | Carbon | |
| | R409 | QRD161J-121 | 120 | 1/6W | Carbon | |
| | R410 | QRD161J-121 | 120 | 1/6W | Carbon | |
| | R411 | QRD161J-121 | 120 | 1/6W | Carbon | |
| | R412 | QRD161J-121 | 120 | 1/6W | Carbon | |
| | R414 | QRD161J-183 | 18K | 1/6W | Carbon | |
| | R415 | QRD161J-681 | 680 | 1/6W | Carbon | |
| | R416 | QRD161J-102 | 1K | 1/6W | Carbon | |
| | R417 | QRD161J-103 | 10K | 1/6W | Carbon | |
| ⚠ | R419 | QRZ0062-100 | 10 | | Fusible | |
| ⚠ | R420 | QRZ0062-100 | 10 | | Fusible | |
| | R501 | QRD161J-105 | 1M | 1/6W | Carbon | |
| | R502 | QRD161J-123 | 12K | 1/6W | Carbon | |
| | R503 | QRD161J-105 | 1M | 1/6W | Carbon | |
| | R504 | QRD161J-273 | 27K | 1/6W | Carbon | |
| | R505 | QRD161J-183 | 18K | 1/6W | Carbon | |
| | R506 | QRD161J-183 | 18K | 1/6W | Carbon | |
| | R507 | QRD161J-101 | 100 | 1/6W | Carbon | |
| | R508 | QRD161J-104 | 100K | 1/6W | Carbon | |
| | R509 | QRD161J-124 | 120K | 1/6W | Carbon | |
| | R510 | QRD161J-472 | 4.7K | 1/6W | Carbon | |
| | R511 | QRD161J-472 | 4.7K | 1/6W | Carbon | |
| | R512 | QRD161J-472 | 4.7K | 1/6W | Carbon | |
| | R513 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R514 | QRD161J-680 | 68 | 1/6W | Carbon | |
| | R515 | QRD161J-393 | 39K | 1/6W | Carbon | |
| | R516 | QRD161J-334 | 330K | 1/6W | Carbon | |
| | R517 | QRD161J-684 | 680K | 1/6W | Carbon | |
| | R518 | QRD161J-271 | 270 | 1/6W | Carbon | |
| | R519 | QRD161J-271 | 270 | 1/6W | Carbon | |
| | R520 | QRD161J-101 | 100 | 1/6W | Carbon | |
| | R521 | QRD161J-822 | 8.2K | 1/6W | Carbon | |
| | R522 | QRD161J-822 | 8.2K | 1/6W | Carbon | |
| | R523 | QRD161J-682 | 6.8K | 1/6W | Carbon | |
| | R524 | QRD161J-682 | 6.8K | 1/6W | Carbon | |
| | R525 | QRD161J-152 | 1.5K | 1/6W | Carbon | |
| | R526 | QRD161J-152 | 1.5K | 1/6W | Carbon | |
| | R527 | QRD161J-331 | 330 | 1/6W | Carbon | |
| | R528 | QRD161J-331 | 330 | 1/6W | Carbon | |
| | R529 | QRD161J-474 | 470K | 1/6W | Carbon | |
| | R530 | QRD161J-474 | 470K | 1/6W | Carbon | |
| | R531 | QRD161J-152 | 1.5K | 1/6W | Carbon | |
| | R532 | QRD161J-152 | 1.5K | 1/6W | Carbon | |
| | R533 | QRD161J-472 | 4.7K | 1/6W | Carbon | |

⚠: Safety parts

**Resistors**

| ⚠ | Item | Part Number | Description | | | Areas |
|---|---|---|---|---|---|---|
| | R534 | QRD161J-472 | 4.7K | 1/6W | Carbon | |
| | R535 | QRD161J-272 | 2.7K | 1/6W | Carbon | |
| | R536 | QRD161J-272 | 2.7K | 1/6W | Carbon | |
| | R537 | QRD161J-272 | 2.7K | 1/6W | Carbon | |
| | R538 | QRD161J-272 | 2.7K | 1/6W | Carbon | |
| | R539 | QRD161J-561 | 560 | 1/6W | Carbon | |
| | R540 | QRD161J-561 | 560 | 1/6W | Carbon | |
| | R541 | QRD161J-273 | 27K | 1/6W | Carbon | |
| | R542 | QRD161J-273 | 27K | 1/6W | Carbon | |
| | R543 | QRD161J-101 | 100 | 1/6W | Carbon | |
| | R544 | QRD161J-101 | 100 | 1/6W | Carbon | |
| | R545 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R546 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R549 | QRD161J-473 | 47K | 1/6W | Carbon | |
| | R550 | QRD161J-473 | 47K | 1/6W | Carbon | |
| | R553 | QRD161J-473 | 47K | 1/6W | Carbon | |
| | R554 | QRD161J-473 | 47K | 1/6W | Carbon | |
| | R557 | QRD161J-680 | 68 | 1/6W | Carbon | |
| | R558 | QRD161J-680 | 68 | 1/6W | Carbon | |
| | R559 | QRD161J-390 | 39 | 1/6W | Carbon | |
| | R560 | QRD161J-390 | 39 | 1/6W | Carbon | |
| | R561 | QRD161J-471 | 470 | 1/6W | Carbon | |
| | R562 | QRD161J-471 | 470 | 1/6W | Carbon | |
| | R563 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R564 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R602 | QRD161J-123 | 12K | 1/6W | Carbon | |
| | R604 | QRD161J-181 | 180 | 1/6W | Carbon | |
| | R605 | QRD161J-182 | 1.8K | 1/6W | Carbon | |
| | R606 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R607 | QRV144F-3302 | 33 | 1/4W | O.M. Film | |
| | R608 | QRD161J-183 | 18K | 1/6W | Carbon | |
| | R609 | QRV144F-3302 | 33 | 1/4W | O.M. Film | |
| | R610 | QRD161J-271 | 270 | 1/6W | Carbon | |
| | R611 | QRD161J-182 | 1.8K | 1/6W | Carbon | |
| | R612 | QRD161J-183 | 18K | 1/6W | Carbon | |
| | R613 | QRD161J-471 | 470 | 1/6W | Carbon | |
| | R614 | QRD161J-104 | 100K | 1/6W | Carbon | |
| | R615 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R616 | QRD161J-182 | 1.8K | 1/6W | Carbon | |
| | R617 | QRD161J-821 | 820 | 1/6W | Carbon | |
| | R618 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R801 | QRD161J-471 | 470 | 1/6W | Carbon | |
| | R802 | QRD161J-472 | 4.7K | 1/6W | Carbon | |
| | R803 | QRD161J-104 | 100K | 1/6W | Carbon | |
| | R804 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R805 | QRD161J-473 | 4.7K | 1/6W | Carbon | |
| | R806 | QRD161J-181 | 180 | 1/6W | Carbon | |
| | R807 | QRD161J-104 | 100K | 1/6W | Carbon | |
| | R809 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R810 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R811 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R812 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R813 | QRD161J-272 | 2.7K | 1/6W | Carbon | |
| | R814 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R815 | QRD161J-271 | 270 | 1/6W | Carbon | |
| | R816 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R817 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R818 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R819 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R820 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R821 | QRB045J-472 | 4.7K | 4W | Array | |
| | R901 | QRD125J-100 | 10 | 1/2W | UNF. Carbon | |
| | R902 | QRD161J-682 | 6.8K | 1/6W | Carbon | |
| | R903 | QRD161J-124 | 120K | 1/6W | Carbon | |
| | R904 | QRD161J-184 | 180K | 1/6W | Carbon | |
| | R905 | QRD161J-683 | 68K | 1/6W | Carbon | |
| | R906 | QRD161J-470 | 47 | 1/6W | Carbon | |
| | R907 | QRD161J-104 | 100K | 1/6W | Carbon | |
| | R910 | QRD161J-104 | 100K | 1/6W | Carbon | |

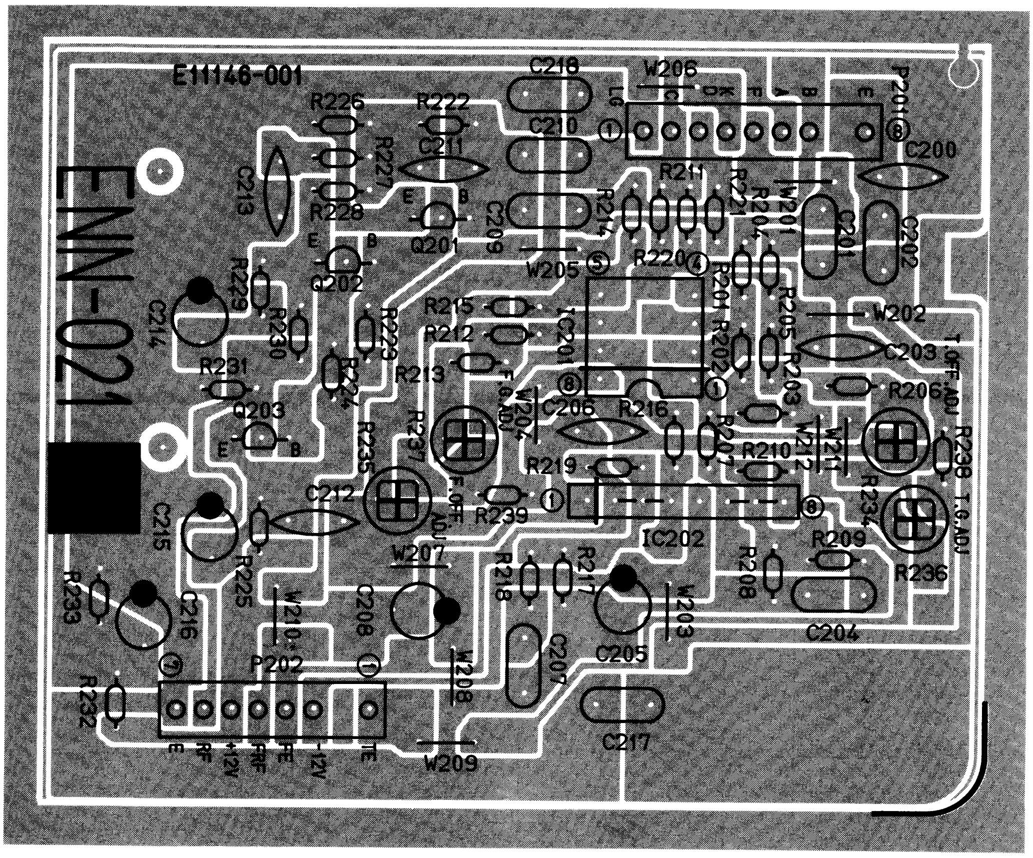
**Resistors**

| ⚠ | Item | Part Number | Description | | | Areas |
|---|---|---|---|---|---|---|
| | R911 | QRD161J-123 | 12K | 1/6W | Carbon | |
| | R912 | QRD161J-182 | 1.8K | 1/6W | Carbon | |
| | R913 | QRD161J-182 | 1.8K | 1/6W | Carbon | |
| | R931 | QRD161J-124 | 120K | 1/6W | Carbon | |
| | R932 | QRD161J-124 | 120K | 1/6W | Carbon | |
| | R933 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R934 | QRD161J-124 | 120K | 1/6W | Carbon | |
| | R935 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R936 | QRD161J-182 | 1.8K | 1/6W | Carbon | |
| | R937 | QRD161J-821 | 820 | 1/6W | Carbon | |
| | R938 | QRD161J-470 | 47 | 1/6W | Carbon | |
| | R939 | QRD161J-103 | 10K | 1/6W | Carbon | |
| | R940 | QRD161J-183 | 18K | 1/6W | Carbon | |
| | R961 | QRD161J-470 | 47 | 1/6W | Carbon | |
| | R962 | QRD161J-104 | 100K | 1/6W | Carbon | |
| | R963 | QRD161J-104 | 100K | 1/6W | Carbon | |
| | R964 | QRD161J-563 | 56K | 1/6W | Carbon | |
| | R965 | QRD161J-563 | 56K | 1/6W | Carbon | |

**Others**

| ⚠ | Items | Part Number | Description | Areas |
|---|---|---|---|---|
| | | EWT011-091 | Ter. Wire Ass'y | |
| | | E72573-001 | Felt Spacer | |
| | | E11145-101 | Circuit Board | |
| | | QMS6302-128 | Headphone Jack | |
| | P101 | QMV5005-007 | 7P Plug Ass'y | |
| | P102 | QMV5005-006 | 6P Plug Ass'y | |
| | P401 | E67764-003 | Terminal | |
| | P402 | E67764-006 | R. Terminal | |
| | P501 | QMS3533-001 | Jack | |
| | P502 | EMN00TV-201A | 2P Pin Jack | |
| | P901 | QMV5005-006 | 6P Plug Ass'y | |
| | FL301 | ELU0001-025 | FL. Display Tube | |
| | OS501 | ECX0086-436EC | Crystal | |
| | P301 | QMV5004-005 | 5 Pin Plug Ass'y | |
| | SW304 | ESP0001-008 | Push Switch | |
| | SW305 | ESP0001-008 | Push Switch | |
| | SW306 | ESP0001-008 | Push Switch | |
| | SW307 | ESP0001-008 | Push Switch | |
| | SW308 | ESP0001-008 | Push Switch | |
| | SW309 | ESP0001-008 | Push Switch | |
| | SW310 | ESP0001-008 | Push Switch | |
| | SW311 | ESP0001-008 | Push Switch | |
| | SW312 | ESP0001-008 | Push Switch | |
| | SW312 | ESP0001-008 | Push Switch | |
| | SW313 | ESP0001-008 | Push Switch | |
| | L601 | ENZ3001-002 | OSC Coil | |
| | CP401 | ICP-F20 | C. Protector | |
| | CP402 | ICP-F20 | C. Protector | |

## 4-(2) ENN-021A RF P.C. Board Ass'y


E11146-001
ENN-021
R226
R222
C218
W206
C210
C211
C200
P201
R227
R228
C213
Q201
C209
R211
R214
R221
R204
W201
C201
C202
Q202
R229
W205
R220
R201
R205
W202
C214
R230
R223
R215
R212
IC201
R202
C203
R231
R224
R213
R206
T.0F.ADJ
Q203
R235
R237
W204
F.0.ADJ
C206
R216
R207
R203
R210
W212
W211
R238
T.G.ADJ
C212
R219
F.0FF ADJ
R239
R234
C215
R225
W207
R218
R217
IC202
R209
R236
R233
C216
W210
C208
W203
R208
C204
C207
C205
R232
P202
W208
C217
W209
E
RF
+12V
FRF
FE
-12V
TE

**Transistors**

| ⚠ | Item | Part Number | Description | | Areas |
|---|---|---|---|---|---|
| | | | | Maker | |
| | Q201 | 2SC535(B,C) | Silicon | Hitachi | |
| | Q202 | 2SC458(C,D) | Silicon | Hitachi | |
| | Q203 | 2SA1029(C,D) | Silicon | Hitachi | |

**IC**

| ⚠ | Item | Part Number | Description | | Areas |
|---|---|---|---|---|---|
| | | | | Maker | |
| | IC201 | NJM072D | IC | JRC | |

**Capacitors**

| ⚠ | Item | Part Number | Description | | | Areas |
|---|---|---|---|---|---|---|
| | C201 | QFP81HG-431 | 430PF | 50V | Poly | |
| | C202 | QFP81HG-471 | 470PF | 50V | Poly | |
| | C203 | QCC21EM-473 | 0.047MF | 25V | Ceramic | |
| | C205 | QETB1CM-226 | 22MF | 16V | Electro | |
| | C206 | QCC21EM-473 | 0.047MF | 25V | Ceramic | |
| | C208 | QETB1CM-226 | 22MF | 16V | Electro | |
| | C209 | QFN81HJ-562 | 5600PF | 50V | Mylar | |
| | C210 | QFN81HJ-562 | 5600PF | 50V | Mylar | |
| | C211 | QCS21HJ-3R0 | 3RPF | 50V | Ceramic | |
| | C212 | QCC21EM-473 | 0.047MF | 25V | Ceramic | |
| | C213 | QCS21HJ-271 | 270PF | 50V | Ceramic | |
| | C214 | QETB1EM-106 | 10MF | 25V | Electro | |
| | C215 | QETB1CM-476 | 47MF | 16V | Electro | |
| | C216 | QETB1CM-476 | 47MF | 16V | Electro | |
| | C217 | QFV81HJ-104 | 0.1MF | 50V | T. Film | |
| | C218 | QFV81HJ-104 | 0.1MF | 50V | T. Film | |

**Resistors**

| ⚠ | Item | Part Number | Description | | | Areas |
|---|---|---|---|---|---|---|
| | R201 | QRD161J-183 | 18K | 1/6W | Carbon | |
| ⚠ | R202 | QRV144F-4703 | 470K | 1/4W | M. Film | |
| ⚠ | R203 | QRV144F-4703 | 470K | 1/4W | M. Film | |
| | R204 | QRD161J-183 | 18K | 1/6W | Carbon | |
| ⚠ | R205 | QRV144F-4703 | 470K | 1/4W | M. Film | |
| ⚠ | R206 | QRV144F-3603 | 360K | 1/4W | M. Film | |
| | R211 | QRD161J-392 | 3.9K | 1/6W | Carbon | |
| ⚠ | R212 | QRV144F-4703 | 470k | 1/4W | M. Film | |
| | R214 | QRD161J-392 | 3.9K | 1/6W | Carbon | |
| ⚠ | R215 | QRV144F-3603 | 360K | 1/4W | M. Film | |
| | R220 | QRD161J-105 | 1M | 1/6W | Carbon | |
| | R221 | QRD161J-105 | 1M | 1/6W | Carbon | |
| | R222 | QRD161J-392 | 3.9K | 1/6W | Carbon | |
| | R223 | QRD161J-183 | 18K | 1/6W | Carbon | |
| | R224 | QRD161J-561 | 560 | 1/6W | Carbon | |
| | R225 | QRD161J-271 | 270 | 1/6W | Carbon | |
| | R226 | QRD161J-391 | 390 | 1/6W | Carbon | |
| | R227 | QRD161J-271 | 270 | 1/6W | Carbon | |
| | R228 | QRD161J-152 | 1.5K | 1/6W | Carbon | |
| | R229 | QRD161J-561 | 560 | 1/6W | Carbon | |
| | R230 | QRD161J-562 | 5.6K | 1/6W | Carbon | |
| | R231 | QRD161J-152 | 1.5K | 1/6W | Carbon | |
| | R232 | QRD161J-272 | 2.7K | 1/6W | Carbon | |
| | R234 | QVZ3513-224 | | | Variable | |
| | R235 | QVZ3513-224 | | | Variable | |
| | R236 | QVZ3513-222 | | | Variable | |
| | R238 | QRD161J-272 | 2.7K | 1/6W | Carbon | |

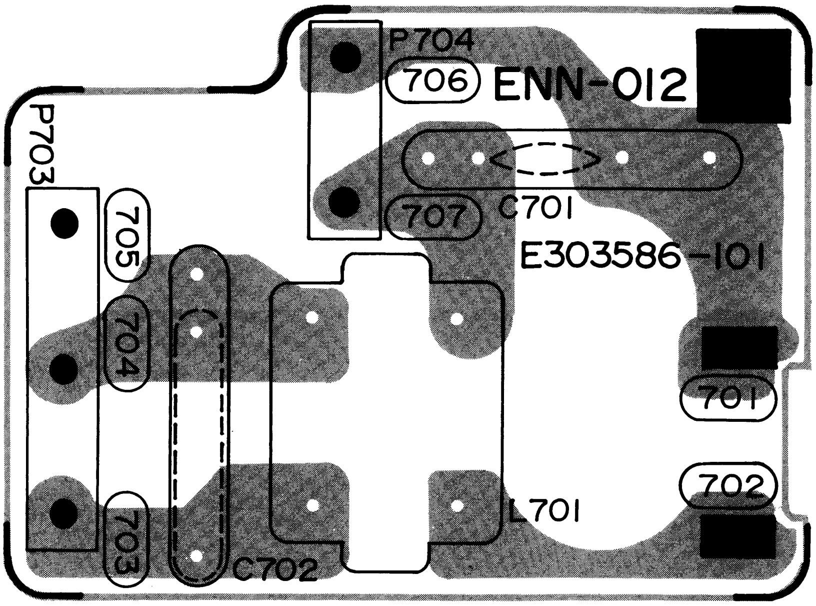
⚠: Safety parts

**Other**

| ⚠ | Item | Part Number | Description | Areas |
|---|---|---|---|---|
| | | E11146-001 | Circuit Board | |

## 4-(3) ENN-012 ☐ Primary P.C. Board Ass'y

**Note:** ENN-012 ☐ Varies according to the areas employed. See note (1) when placing on order.



**Note (1)**

| P.C. Board Ass'y | Designated Areas |
|---|---|
| ENN-012 A | U.S.A. |
| ENN-012 B | U.S. Military Market & Other Countries |
| ENN-012 C | Europe |
| ENN-012 D | U.K. |
| ENN-012 F | Canada |

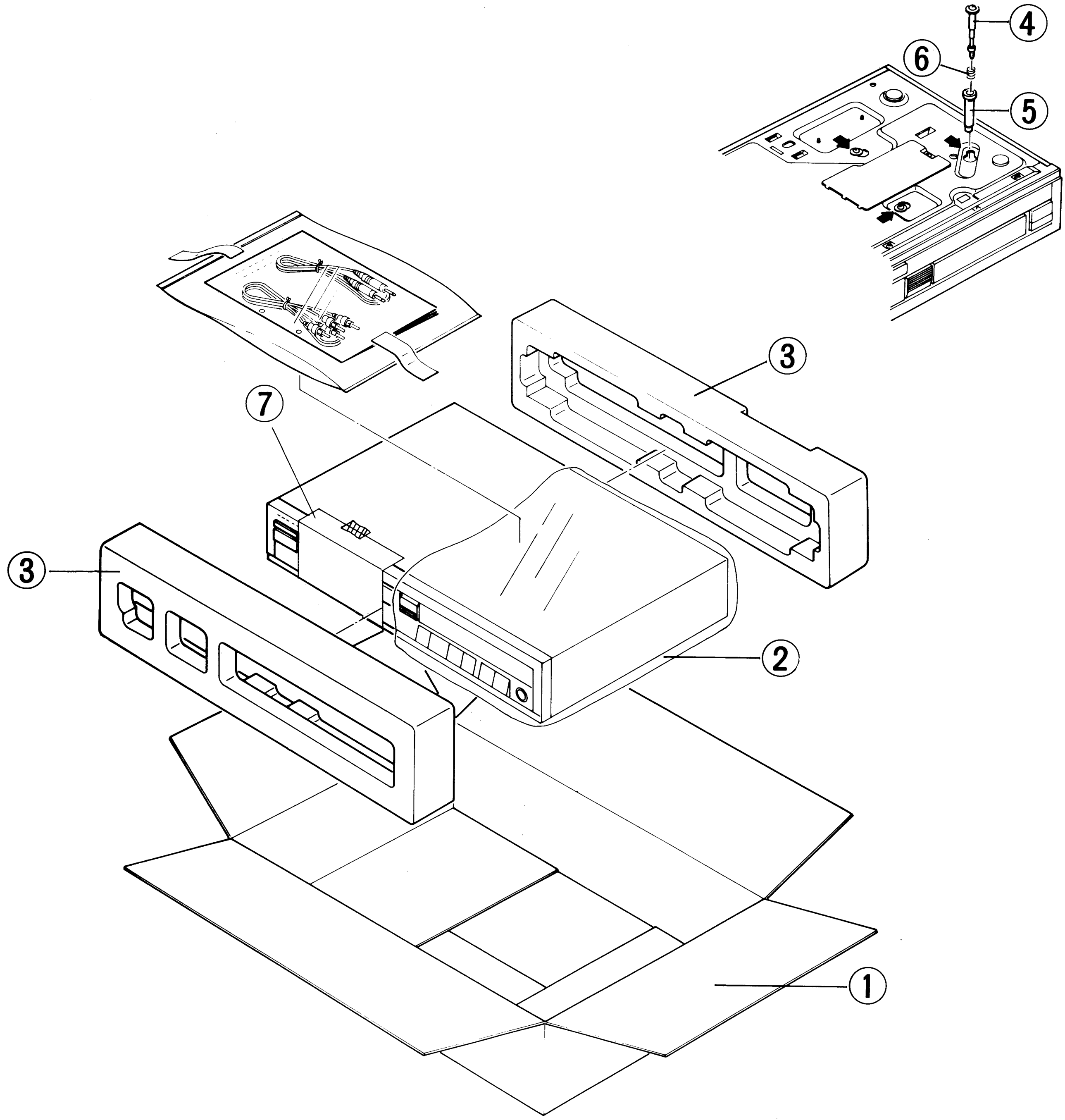
**Capacitors**

| ⚠ | Item | Part Number | Description | | | Areas |
|---|---|---|---|---|---|---|
| | C701 | QFZ9020-103 | 0.01MF | | M.Mylar | B |
| | C701 | QFZ9020-103 | 0.01MF | | M.Mylar | C |
| | C701 | QFZ9020-103BS | 0.01MF | | M.Mylar | DBS |
| | C701 | QCZ9019-103 | 0.01MF | | Ceramic | A |
| | C702 | QFZ9019-223 | 0.022MF | | M.Film | A |
| | C702 | QFZ9020-223 | 0.022MF | | M.Mylar | B |
| | C702 | QFZ9020-223 | 0.022MF | | M.Mylar | C |
| | C702 | QFZ9020-223BS | 0.022MF | | M.Mylar | DBS |

**Others**

| ⚠ | Item | Part Number | Description | Areas |
|---|---|---|---|---|
| | L701 | ENZ5002-003BS | Line Filter | DBS |
| | L701 | ENZ5002-003 | Line Filter | A |
| | L701 | ENZ5002-003 | Line Filter | B |
| | L701 | ENZ5002-003 | Line Filter | C |
| | T701 | E65508-002 | Tab | |
| | T703 | E67764-203 | Terminal Ass'y | |
| | T704 | E67764-202 | Terminal Ass'y | |
| | | E303586-101 | Circuit Board | A |
| | | E303586-101 | Circuit Board | B |
| | | E303586-101 | Circuit Board | C |
| | | E303586-101BS | Circuit Board | DBS |

# 6. Packing Materials and Part Numbers



| ⚠ | No. | Part Number | Part Name | Q'ty | Description | Areas |
|---|---|---|---|---|---|---|
| | 1 | PK-XLV200BE | Packing Case | 1 | | Except ES |
| | | PK-XLV200BEES | Packing Case | 1 | | ES only |
| | 2 | E300196-047 | Envelope | 1 | | Except BS |
| | | E300196-047B | Envelope | 1 | | BS only |
| | 3 | NZ-XLV200 | Packing Pad | 1 | Left(E25093-001)<br>Right(E25093-002) | |
| | 4 | E72395-001 | Screw | 3 | | |
| | 5 | E72394-001 | Spacer | 3 | | |
| | 6 | E72396-001 | Comp Spring | 3 | | |
| | 7 | E303871-002 | Caution Sheet | 1 | Before Use | |

# 7. Accessories List

| ⚠ | Part Number | Part Name | Description | Areas |
|---|---|---|---|---|
| | E30580-1265A | Instruction Book | | Except BS |
| | E30580-1265ABS | Instruction Book | | BS only |
| | BT20047C | Warranty Card | | J.P. PG |
| | BT20025H | Warranty Card | | C |
| | BT20029C | Warranty Card | | A |
| | BT20060 | Warranty Card | | BS |
| | BT20064 | Warranty Card | | G |
| | BT20044E | Safety Instruction Book | | J |
| | BT20046B | Service Information Card | | J.P.PG |
| | BT20071A | SVC Center List | | C |
| | BT20066 | EEC Agency | | BS, G |
| | E70570-001 | Keeping Card (1) | for Laser | J |
| | E70571-001 | Keeping Card (2) | for Laser | J |
| | E70572-001 | Keeping Card (3) | for Laser | J |
| | A76332-2 | Keeping Card | | J |
| | E35497-017 | Caution Sheet | for Line Voltage | P |
| | E35497-019 | Caution Sheet | for Line Voltage | U, PG |
| ⚠ | E04056 | Siemens Plug | | U, PG |
| | EWP302-101 | Signal Cord | | |
| | EWP805-001 | 1P Plug Cord Ass'y | | |
| | E66416-003 | Envelope | for Warranty Card | J |
| | E41202-2 | Envelope | | Except BS |
| | E41202-2B | Envelope | | BS only |

⚠: Safety Parts

**The Marks for Designated Area**

| | | | |
|---|---|---|---|
| J .............. | U.S.A. | ES .............. | Spain |
| C .............. | Canada | BS .............. | U.K. |
| A .............. | Australia | P, PG ............ | U.S. Military Market |
| E .............. | Europe | U .............. | Other Countries |
| G .............. | West Germany | No mark indicates all areas | |

JVC

# SERVICE MANUAL

## COMPACT DISC PLAYER

## MODEL XL-V200B

## SUPPLEMENT

This supplement to the Service Manual for the Model XL-V200B is published to cover alterations gradually taken in production of the series for the purpose of giving the unit a greater efficiency and improving productivity as well as reducing the cost of production.
This includes more detailed block diagrams and additional timing charts besides new illustrations of waveforms to correct errors of scales and test points in those printed in the Service Manual.
Please utilize this supplement comparing with the Service Manual (No. 2847: July 1985).

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4. XL-V200B Schematic Diagrams .......... Insertion
Parts List .......... Separate-volume Insertion
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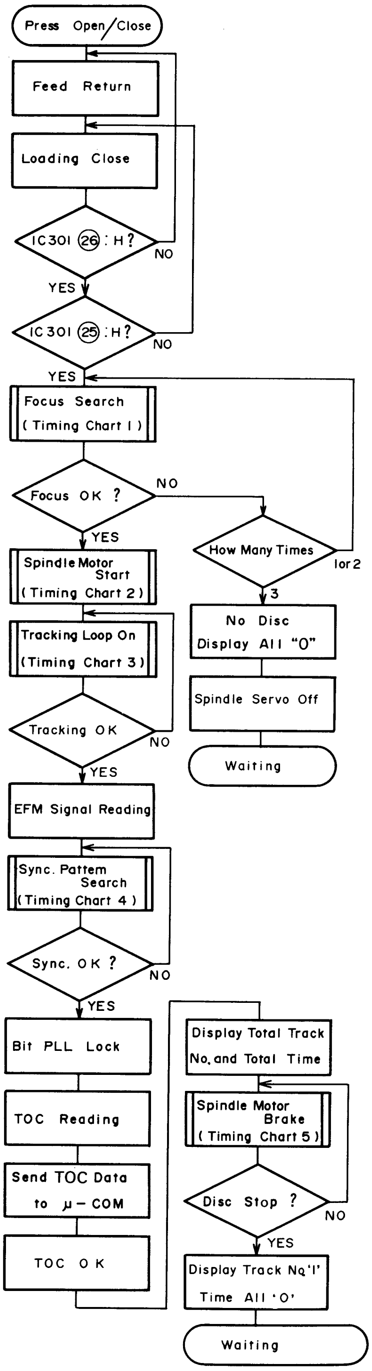
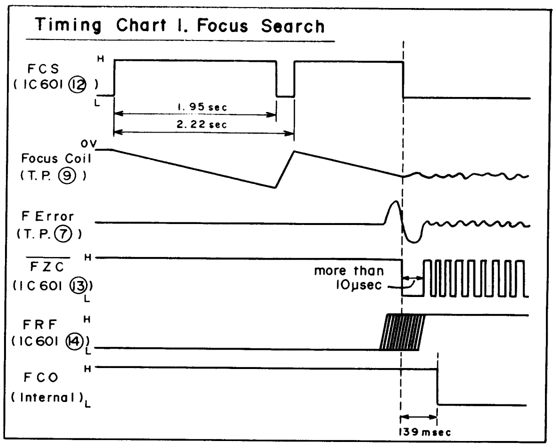
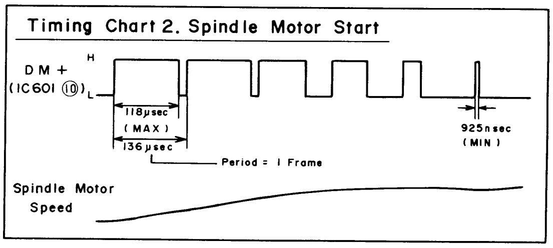
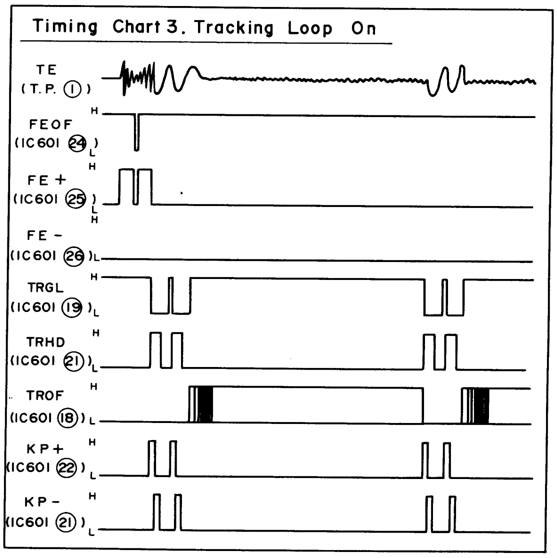
No. 2847B
Nov. 1985

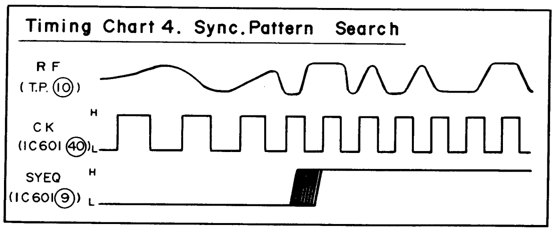
# 1. Timing Chart for TOC Reading

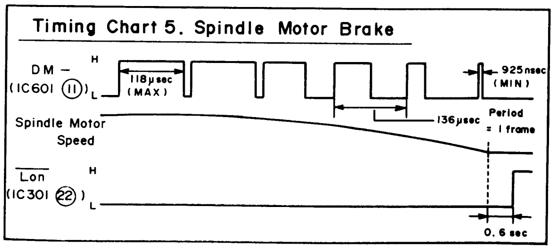

Press Open/Close
Feed Return
Loading Close
IC301 ㉖ : H ?
NO
YES
IC301 ㉕ : H ?
NO
YES
Focus Search (Timing Chart 1)
Focus OK ?
NO
YES
How Many Times
1or 2
3
No Disc Display All "0"
Spindle Servo Off
Waiting
Spindle Motor Start (Timing Chart 2)
Tracking Loop On (Timing Chart 3)
Tracking OK
NO
YES
EFM Signal Reading
Sync. Pattern Search (Timing Chart 4)
Sync. OK ?
NO
YES
Bit PLL Lock
TOC Reading
Send TOC Data to μ-COM
TOC OK
Display Total Track No. and Total Time
Spindle Motor Brake (Timing Chart 5)
Disc Stop ?
NO
YES
Display Track No.'1' Time All '0'
Waiting


Timing Chart 1. Focus Search
FCS (IC601 ⑫)
H
L
1.95 sec
2.22 sec
0V
Focus Coil (T.P. ⑨)
F Error (T.P. ⑦)
FZC (IC601 ⑬)
more than 10μsec
FRF (IC601 ⑭)
FCO (Internal)
139 msec


Timing Chart 2. Spindle Motor Start
DM+ (IC601 ⑩)
H
L
118μsec (MAX)
136μsec
Period = 1 Frame
925nsec (MIN)
Spindle Motor Speed

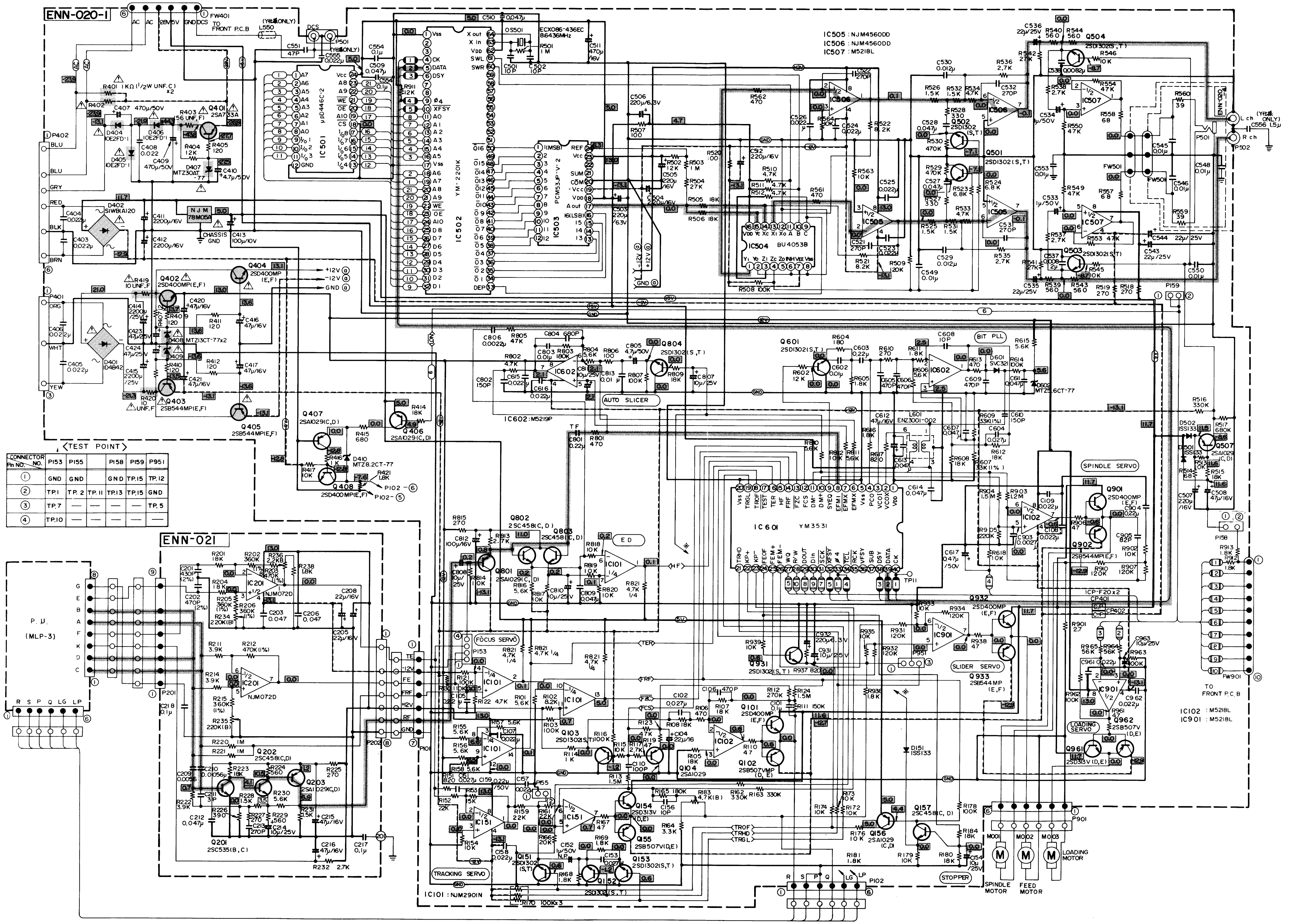

Timing Chart 3. Tracking Loop On
TE (T.P. ①)
FEOF (IC601 ㉔)
FE+ (IC601 ㉕)
FE- (IC601 ㉖)
TRGL (IC601 ⑲)
TRHD (IC601 ㉑)
TROF (IC601 ⑱)
KP+ (IC601 ㉒)
KP- (IC601 ㉑)
H
L


Timing Chart 4. Sync. Pattern Search
RF (T.P. ⑩)
CK (IC601 ㊵)
SYEQ (IC601 ⑨)
H
L


Timing Chart 5. Spindle Motor Brake
DM- (IC601 ⑪)
H
L
118μsec (MAX)
136μsec
925nsec (MIN)
Period = 1 frame
Spindle Motor Speed
Lon (IC301 ㉒)
0.6 sec

# 4. Schematic Diagrams

## 4-(1) Main and RF Section

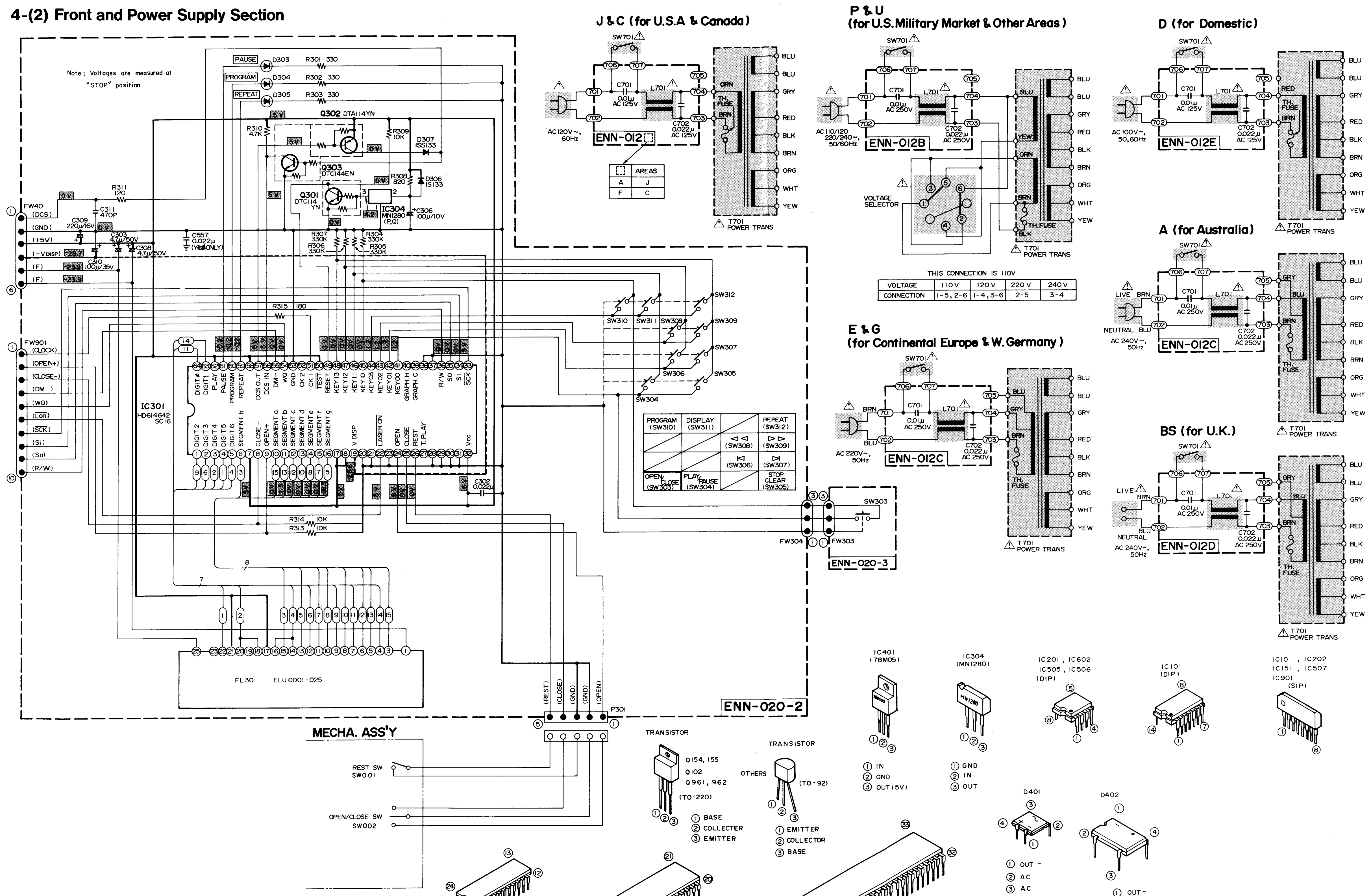

ENN-020-1
ENN-021
IC505 : NJM4560DD
IC506 : NJM4560DD
IC507 : M5218L
IC501
IC502 YM-2201K
IC503 PCM53JP-V-2
IC504 BU4053B
IC601 YM3531
IC602 : M5219P
IC101 : NJM2901N
IC102 : M5218L
IC901 : M5218L
P.U. (MLP-3)
AUTO SLICER
BIT PLL
FOCUS SERVO
TRACKING SERVO
SPINDLE SERVO
SLIDER SERVO
LOADING SERVO
STOPPER
SPINDLE MOTOR
FEED MOTOR
LOADING MOTOR
L ch
R ch
TO FRONT P.C.B
TO FRONT P.C.B

〈TEST POINT〉

| CONNECTOR NO. / Pin NO. | P153 | P155 | | P158 | P159 | P951 |
|---|---|---|---|---|---|---|
| ① | GND | GND | | GND | TP.15 | TP.12 |
| ② | TP.1 | TP.2 | TP.11 | TP.13 | TP.15 | GND |
| ③ | TP.7 | — | — | — | — | TP.5 |
| ④ | TP.10 | — | — | — | — | — |

XL-V200B

## 4-(2) Front and Power Supply Section

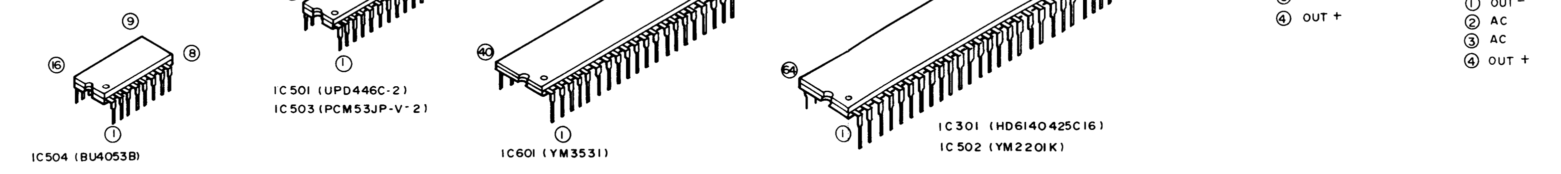

Note: Voltages are measured at "STOP" position
PAUSE
PROGRAM
REPEAT
D303 R301 330
D304 R302 330
D305 R303 330
Q302 DTA114YN
R310 4.7K
R309 10K
D307 1SS133
Q303 DTC144EN
R308 820
D306 1S133
Q301 DTC114YN
IC304 MN1280 (P,Q)
C306 100μ/10V
R311 120
C311 470P
C309 220μ/16V
C303 4.7μ/50V
C308 4.7μ/50V
C310 100μ/35V
C557 0.022μ (YB ONLY)
R307 330K
R306 330K
R304 330K
R305 330K
R315 180
FW401
(DCS)
(GND)
(+5V)
(−VDISP)
(F)
(F)
-28.7
-23.9
-23.9
FW901
(CLOCK)
(OPEN+)
(CLOSE−)
(DM−)
(WQ)
(Lon)
(SCK)
(Si)
(So)
(R/W)
IC301 HD614642 SC16
DIGIT 0
DIGIT 1
PLAY
PAUSE
PROGRAM
REPEAT
DCS OUT
DCS IN
DM−
WQ
GND
CK 2
CK 1
TEST
RESET
KEY 13
KEY 12
KEY 10
KEY 03
KEY 01
KEY 00
GRAPH. H
GRAPH. C
R/W
SO
SI
SCK
DIGIT 2
DIGIT 3
DIGIT 4
DIGIT 5
DIGIT 6
SEGMENT h
CLOSE
OPEN +
SEGMENT a
SEGMENT b
SEGMENT c
SEGMENT d
SEGMENT e
SEGMENT f
SEGMENT g
V DISP
LASER ON
OPEN
CLOSE
REST
T. PLAY
Vcc
C302 0.022μ
R314 10K
R313 10K
SW310
SW311
SW308
SW312
SW309
SW307
SW306
SW305
SW304
SW303
FW304
FW303
ENN-020-3
FL301 ELU0001-025
ENN-020-2
(REST)
(CLOSE)
(GND)
(GND)
(OPEN)
P301
MECHA. ASS'Y
REST SW SW001
OPEN/CLOSE SW SW002
J & C (for U.S.A & Canada)
SW701
C701 0.01μ AC 125V
L701
C702 0.022μ AC 125V
AC 120V~, 60Hz
ENN-012
ORN
TH. FUSE
BRN
BLU
BLU
GRY
RED
BLK
BRN
ORG
WHT
YEW
T701 POWER TRANS
TRANSISTOR
Q154, 155
Q102
Q961, 962
(TO-220)
① BASE
② COLLECTER
③ EMITTER
TRANSISTOR
OTHERS
(TO-92)
① EMITTER
② COLLECTOR
③ BASE
P & U (for U.S. Military Market & Other Areas)
AC 110/120 220/240~, 50/60Hz
C701 0.01μ AC 250V
C702 0.022μ AC 250V
ENN-012B
VOLTAGE SELECTOR
YEW
ORN
BRN
TH. FUSE
BLK
E & G (for Continental Europe & W. Germany)
AC 220V~, 50Hz
ENN-012C
D (for Domestic)
AC 100V~, 50,60Hz
C701 0.01μ AC 125V
C702 0.022μ AC 125V
ENN-012E
RED
A (for Australia)
LIVE BRN
NEUTRAL BLU
AC 240V~, 50Hz
ENN-012C
BS (for U.K.)
ENN-012D
IC401 (78M05)
① IN
② GND
③ OUT (5V)
IC304 (MN1280)
① GND
② IN
③ OUT
IC201, IC602
IC505, IC506
(DIP)
IC101 (DIP)
IC10, IC202
IC151, IC507
IC901 (SIP)

| ⬚ | AREAS |
|---|---|
| A | J |
| F | C |

THIS CONNECTION IS 110V

| VOLTAGE | 110V | 120V | 220V | 240V |
|---|---|---|---|---|
| CONNECTION | 1-5, 2-6 | 1-4, 3-6 | 2-5 | 3-4 |

| | | |
|---|---|---|
| PROGRAM (SW310) | DISPLAY (SW311) | PEPEAT (SW312) |
| | ◁◁ (SW308) | ▷▷ (SW309) |
| | ⊲⊲ (SW306) | ⊳⊳ (SW307) |
| OPEN/CLOSE (SW303) | PLAY/PAUSE (SW304) | STOP CLEAR (SW305) |


D401
① OUT −
② AC
③ AC
④ OUT +
D402
① OUT −
② AC
③ AC
④ OUT +
IC504 (BU4053B)
IC501 (UPD446C-2)
IC503 (PCM53JP-V-2)
IC601 (YM3531)
IC301 (HD6140425C16)
IC502 (YM2201K)

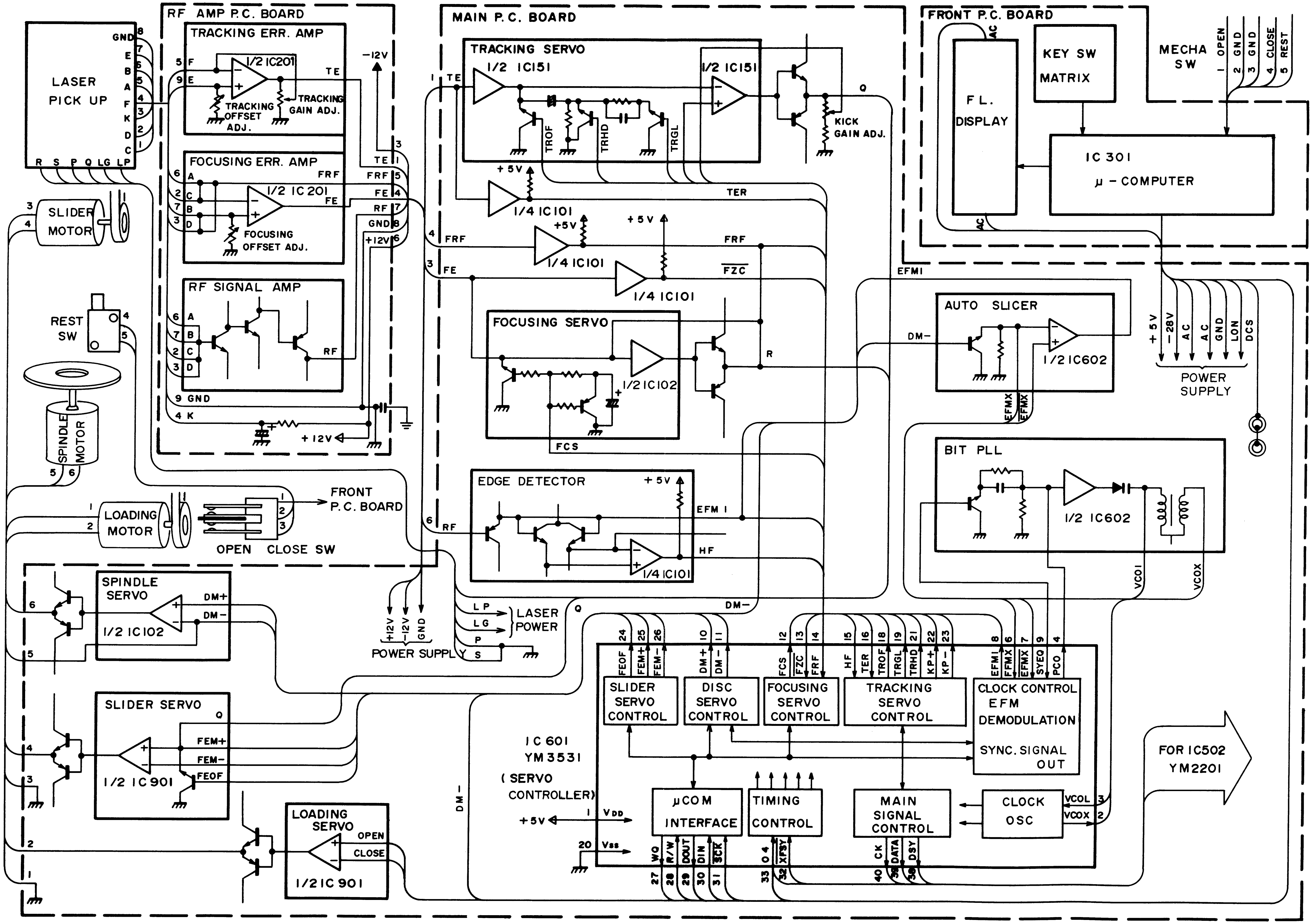
Notes:

1. ▨ shows DC voltage to the chassis with no signal input.
2. —— indicates positive B power supply.
3. ---- indicates negative B power supply.
4. ▨ indicates signal path.
5. When replacing the parts in the darkened area ( ▨ ) and those marked with ⚠, be sure to use the designated parts to ensure safety.
6. This is the standard circuit diagram.
   The design and contents are subject to change without notice.

(No. 2847B)

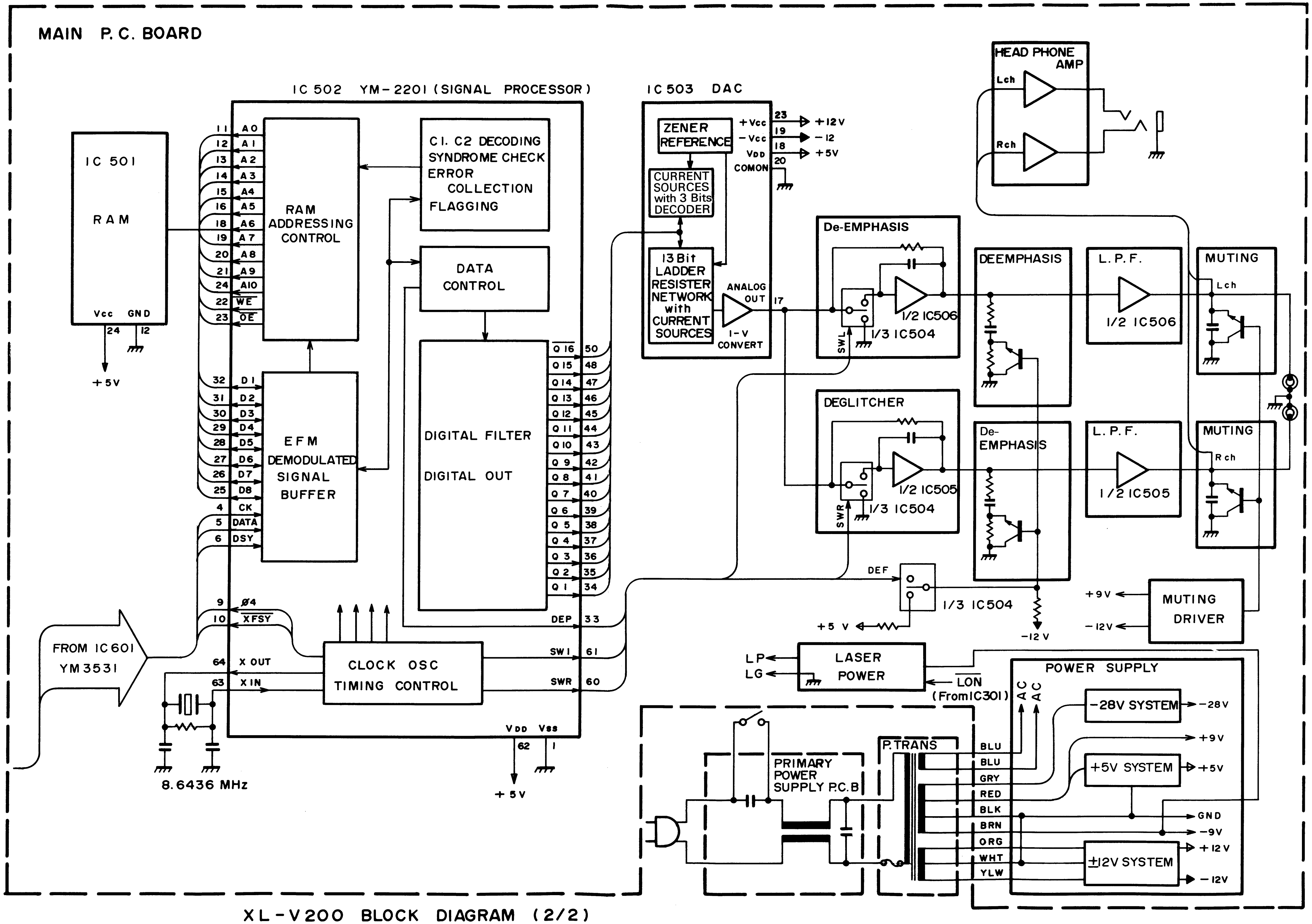
# 3. Block Diagrams

## 3-(1) Servo and Microprocessor Sections


LASER PICK UP
GND E B A F K D C
R S P Q LG LP
RF AMP P.C. BOARD
TRACKING ERR. AMP
1/2 IC201
TE
TRACKING OFFSET ADJ.
TRACKING GAIN ADJ.
-12V
FOCUSING ERR. AMP
FRF
1/2 IC 201
FE
FOCUSING OFFSET ADJ.
RF SIGNAL AMP
RF
9 GND
4 K
+12V
TE FRF FE RF GND +12V
SLIDER MOTOR
REST SW
SPINDLE MOTOR
LOADING MOTOR
FRONT P.C. BOARD
OPEN CLOSE SW
MAIN P.C. BOARD
TRACKING SERVO
1/2 IC151
TROF
TRHD
TRGL
KICK GAIN ADJ.
Q
+5V
1/4 IC101
TER
FRF
FE
FZC
FOCUSING SERVO
1/2 IC102
R
FCS
EDGE DETECTOR
EFM I
HF
1/4 IC101
LP LG P S
LASER POWER
+12V -12V GND
POWER SUPPLY
DM-
SPINDLE SERVO
DM+
DM-
1/2 IC102
SLIDER SERVO
FEM+
FEM-
FEOF
1/2 IC901
LOADING SERVO
OPEN
CLOSE
1/2 IC 901
FRONT P.C. BOARD
F.L. DISPLAY
AC
KEY SW MATRIX
MECHA SW
1 OPEN 2 GND 3 GND 4 CLOSE 5 REST
IC 301
μ-COMPUTER
EFMI
AUTO SLICER
DM-
1/2 IC602
EFMX EFMX
+5V -28V AC AC GND LON DCS
POWER SUPPLY
BIT PLL
1/2 IC602
VCOI
VCOX
IC 601
YM3531
(SERVO CONTROLLER)
+5V
1 VDD
20 VSS
SLIDER SERVO CONTROL
FEOF FEM+ FEM-
24 25 26
DISC SERVO CONTROL
DM+ DM-
10 11
FOCUSING SERVO CONTROL
FCS FZC FRF
12 13 14
TRACKING SERVO CONTROL
HF TER TROF TRGL TRHD KP+ KP-
15 16 17 18 19 21 22 23
CLOCK CONTROL EFM DEMODULATION SYNC. SIGNAL OUT
EFMI FFMX EFMX SYEO PCO
8 6 7 9 4
μCOM INTERFACE
TIMING CONTROL
MAIN SIGNAL CONTROL
CLOCK OSC
VCOL 3
VCOX 2
WO R/W DOUT DIN SCK
27 28 29 30 31
O4 XFSY
33 32
CK DATA DSY
40 39 38
FOR IC502 YM2201

XL-V200 BLOCK DIAGRAM (1/2)

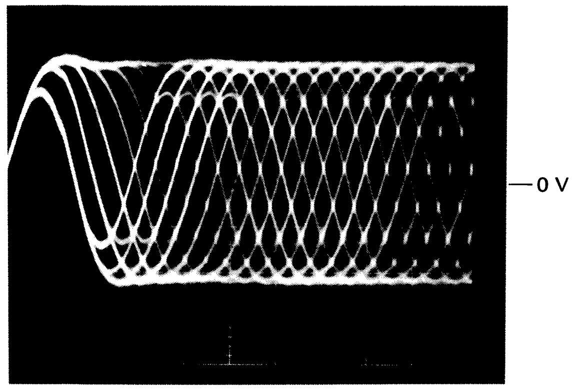
### 3-(2) Audio and Power Supply Sections


MAIN P. C. BOARD
IC 501
RAM
Vcc GND
24 12
+5V
IC 502 YM-2201 (SIGNAL PROCESSOR)
RAM ADDRESSING CONTROL
C1. C2 DECODING SYNDROME CHECK ERROR COLLECTION FLAGGING
DATA CONTROL
DIGITAL FILTER
DIGITAL OUT
EFM DEMODULATED SIGNAL BUFFER
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 WE OE
11 12 13 14 15 16 18 19 20 21 24 22 23
D1 D2 D3 D4 D5 D6 D7 D8 CK DATA DSY
32 31 30 29 28 27 26 25 4 5 6
Q16 Q15 Q14 Q13 Q12 Q11 Q10 Q9 Q8 Q7 Q6 Q5 Q4 Q3 Q2 Q1
50 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34
DEP 33
SW1 61
SWR 60
Ø4 9
XFSY 10
X OUT 64
X IN 63
CLOCK OSC TIMING CONTROL
VDD VSS
62 1
+5V
8.6436 MHz
FROM IC601 YM3531
IC 503 DAC
ZENER REFERENCE
CURRENT SOURCES with 3 Bits DECODER
13 Bit LADDER RESISTER NETWORK with CURRENT SOURCES
ANALOG OUT 17
I-V CONVERT
+Vcc 23 +12V
−Vcc 19 −12
VDD 18 +5V
COMON 20
De-EMPHASIS
1/2 IC506
1/3 IC504
SWL
DEGLITCHER
1/2 IC505
1/3 IC504
SWR
DEEMPHASIS
De-EMPHASIS
L. P. F.
1/2 IC506
L. P. F.
1/2 IC505
MUTING
Lch
MUTING
Rch
HEAD PHONE AMP
Lch
Rch
DEF
1/3 IC504
+5 V
−12 V
+9V
−12V
MUTING DRIVER
LP
LG
LASER POWER
LON (From IC301)
POWER SUPPLY
AC AC
−28V SYSTEM −28V
+9V
+5V SYSTEM +5V
GND
−9V
±12V SYSTEM +12V −12V
PRIMARY POWER SUPPLY P.C.B
P.TRANS
BLU BLU GRY RED BLK BRN ORG WHT YLW

XL-V200 BLOCK DIAGRAM (2/2)

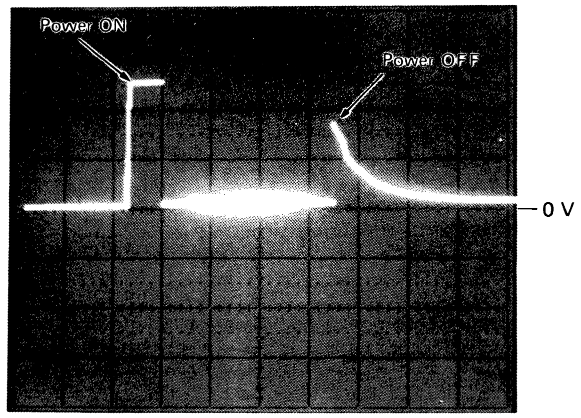
# 2. Important Waveforms

**1. Eye pattern (RF signal)**
TP-10; standard eye pattern.



Eye pattern 0.5 µs/div 0.5 V/div

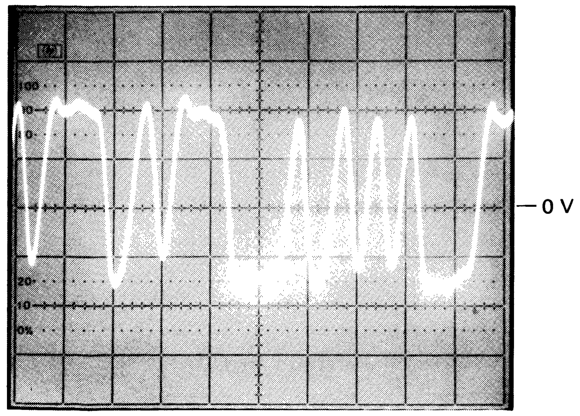
**2. Reset signal of microcomputer**
Q301 collector (IC301 Pin ㊾ )



0.1 s/div 2 V/div

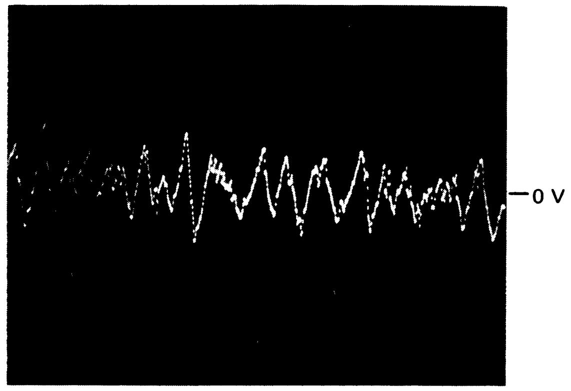
**3. Eye pattern partially expanded**
Shows the TP-10 eye pattern.

Each eye pattern



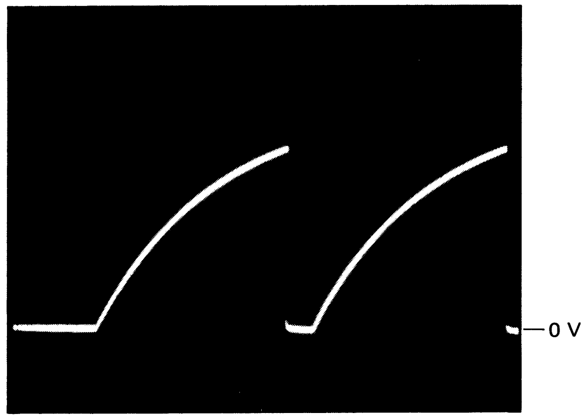
2 µs/div 0.5 V/div (DC range) (Storage)

**4. Focus signal during play**
TP-9 operates with period of about 0.2 – 1 ms.



1 ms/div 0.5 V/div (AC range)

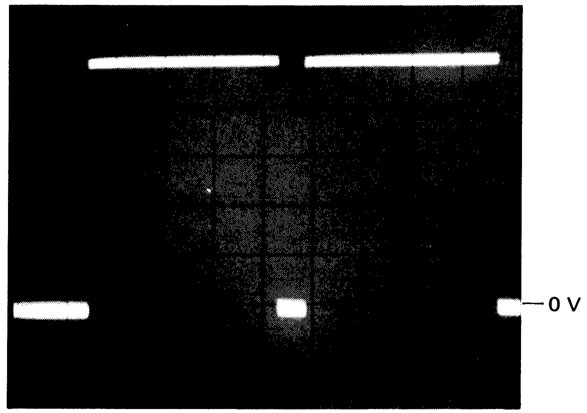
**5. Focus search voltage**
Between connecting point R115, R117 and GND; the waveform lens is moved up and down by this voltage when the platter is loaded without a disc.



0.5 s/div 0.5 V/div

**6 Pulse for focus search voltage**
Pulse for focus search transmitted from IC601

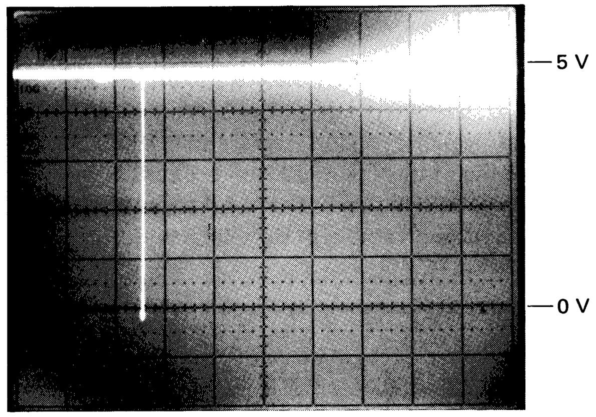
IC601 Pin ⑫ FCS signal



0.5 s/div 1 V/div

**7. Focus zero-cross output**
Pulse showing that focus output waveform has almost passed the zero point (at TOC reading).

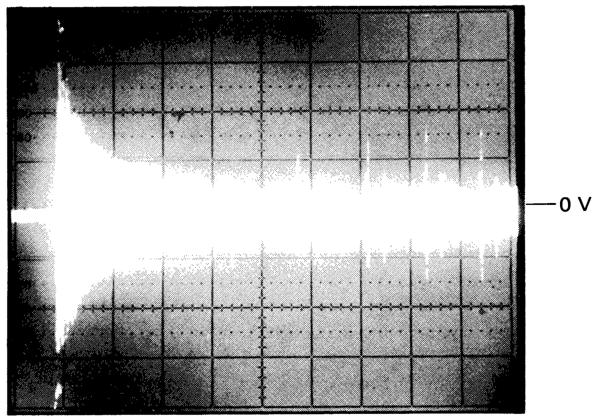
IC101 Pin ⑬ output



2 ms/div 1 V/div (Storage)

**8 Focus drive waveform**
Waveform until focus is obtained, spindle motor starts to rotate and TOC is read.

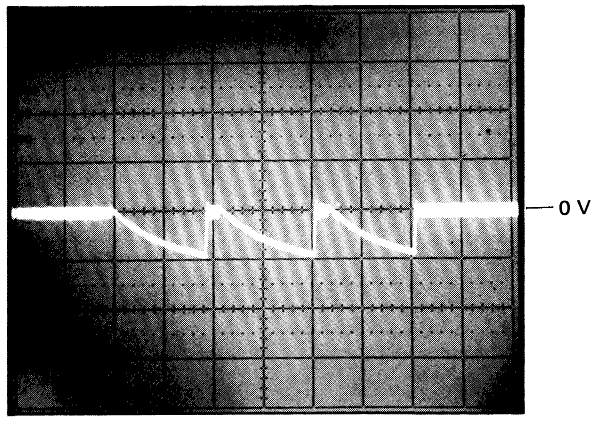
TP-9, when focus has been finished and motor starts to rotate



0.2 s/div 0.5 V/div

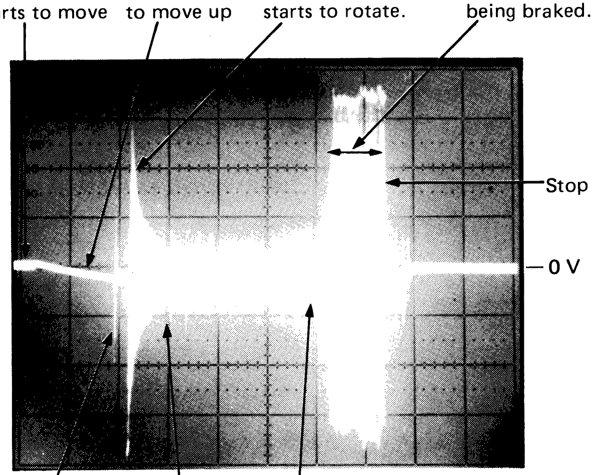
**9. Drive waveform during focus search**
Drive waveform of focus coil when the platter is loaded without a disc.

TP-9; focus signal when no disc is loaded



1 s/div 1 V/div

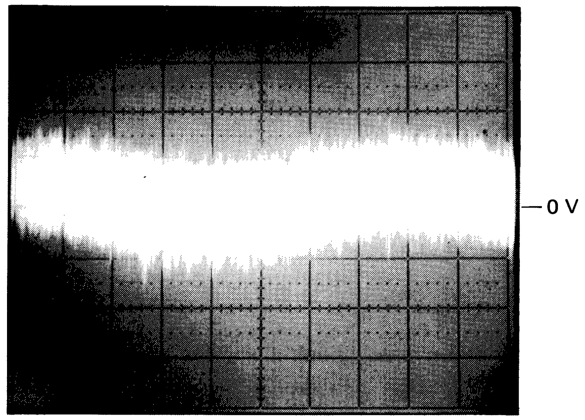
**10. Waveform until TOC is read**
TP-9 until TOC has been read and spindle motor stops



0.5 s/div 0.5 V/div (Storage)

**11. Tracking waveform during normal play**
TP-6 output

Waveform during TP-6 play



20 ms/div 0.5 mV/div

Sub. Point of Test Point
TP-6 : Emitter of Q154
TP-9 : Emitter of Q101

## Maintenance of Laser Pickup

**1. Service life of the laser pickup**

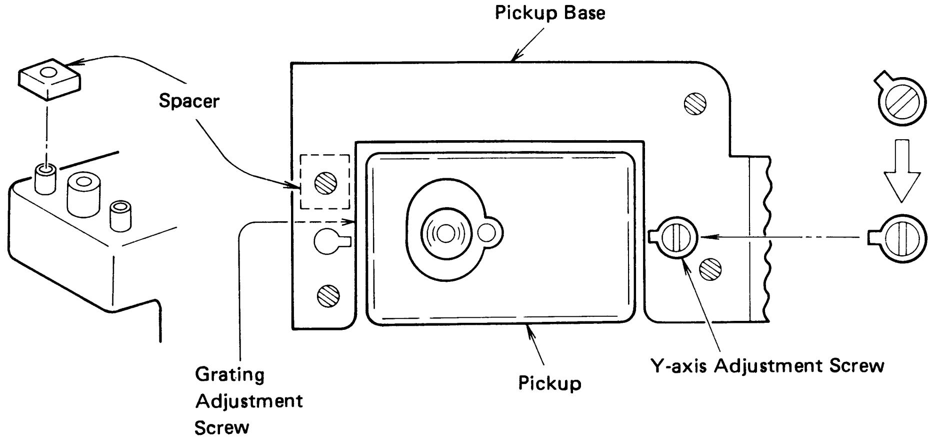
1) Turn the power on after connecting IC301 pin ㉒ on the front PCB (ENN-020-2) to GND.
2) Measure the laser power with the laser power meter.
3) Measure the EFM output if a laser power meter is not available.
4) When the measured value is as shown in the table below, replace the pickup because the service life of the laser diode is judged as having expired.

| Measurement value | Measurement instrument | Measured value |
|---|---|---|
| Laser power | Laser power meter | Less than 0.1 mW |
| EFM output (Amplitude of eye pattern) | Oscilloscope | Less than 1.7 V |

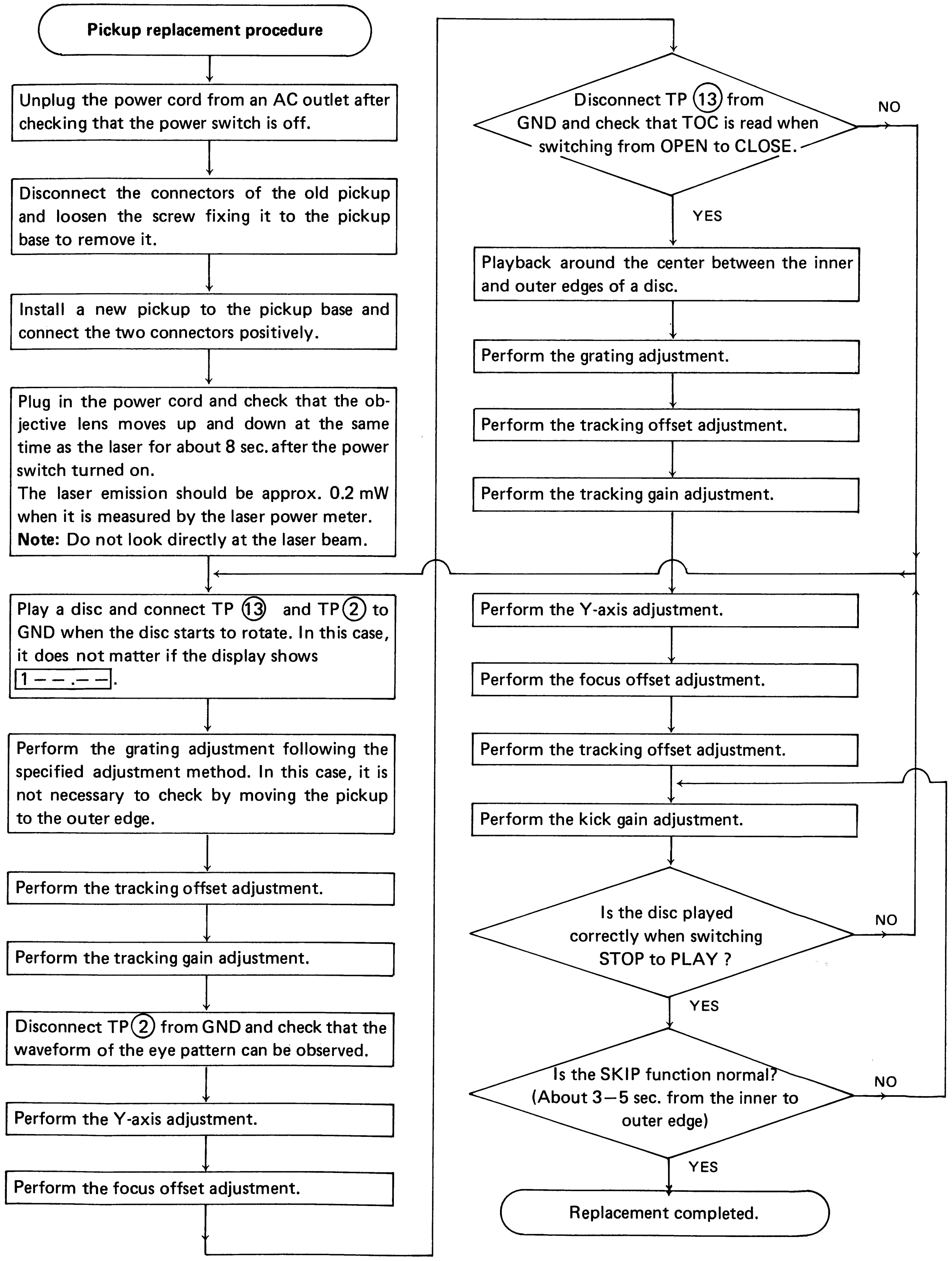
5) When replacing the pickup, set the Y-axis adjustment screw so that its protruding section faces the left (pickup side) as shown in the figure below.
If a spacer is inserted, remove it because it is unnecessary.

**2. Semifixed resistor on the APC board**

The semifixed resistor on the APC board installed with the pickup is for the laser power adjustment. Do not touch the semifixed resistor because this adjustment should be performed as part of a pair of adjustments to match the characteristics of the optical block.
If the laser power is too low, replace the pickup because the service life of the laser diode has expired.
Turning the semifixed resistor for a normal pickup may damage the pickup because of overcurrent.


Pickup Base
Spacer
Grating Adjustment Screw
Pickup
Y-axis Adjustment Screw

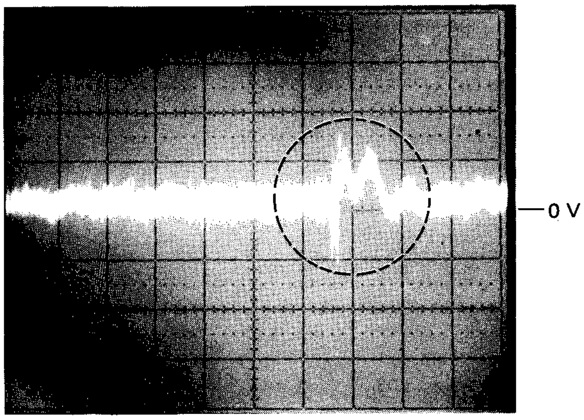
6) Replace according to the flow chart of pickup replacement.


Pickup replacement procedure
Unplug the power cord from an AC outlet after checking that the power switch is off.
Disconnect the connectors of the old pickup and loosen the screw fixing it to the pickup base to remove it.
Install a new pickup to the pickup base and connect the two connectors positively.
Plug in the power cord and check that the objective lens moves up and down at the same time as the laser for about 8 sec. after the power switch turned on.
The laser emission should be approx. 0.2 mW when it is measured by the laser power meter.
Note: Do not look directly at the laser beam.
Play a disc and connect TP ⑬ and TP ② to GND when the disc starts to rotate. In this case, it does not matter if the display shows 1 – – . – –.
Perform the grating adjustment following the specified adjustment method. In this case, it is not necessary to check by moving the pickup to the outer edge.
Perform the tracking offset adjustment.
Perform the tracking gain adjustment.
Disconnect TP ② from GND and check that the waveform of the eye pattern can be observed.
Perform the Y-axis adjustment.
Perform the focus offset adjustment.
Disconnect TP ⑬ from GND and check that TOC is read when switching from OPEN to CLOSE.
NO
YES
Playback around the center between the inner and outer edges of a disc.
Perform the grating adjustment.
Perform the tracking offset adjustment.
Perform the tracking gain adjustment.
Perform the Y-axis adjustment.
Perform the focus offset adjustment.
Perform the tracking offset adjustment.
Perform the kick gain adjustment.
Is the disc played correctly when switching STOP to PLAY ?
NO
YES
Is the SKIP function normal? (About 3–5 sec. from the inner to outer edge)
NO
YES
Replacement completed.

**12. TP-7 waveform of high speed search in forward direction**

Output when track is jumped is visible

TP-7; in case of transporting in high speed search ▶▶

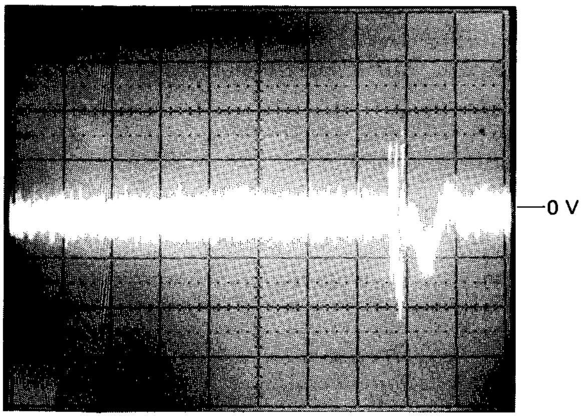


2 ms/div 0.5 V/div

**13. TP-7 waveform of high speed search in backward direction**

The waveform the reverse of that in high speed search in forward direction is shown.

TP-7; in case of returning by high speed search ◀◀

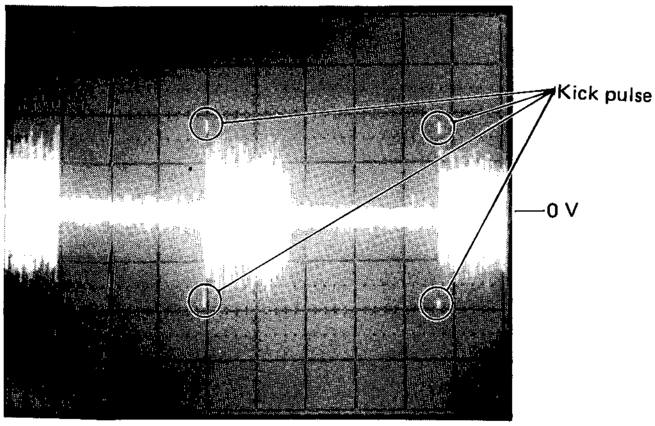


2 ms/div 0.5 V/div

**14. Drive waveform during high speed search**

Output such as noise is output when track is crossed.

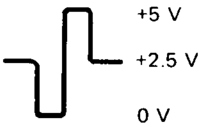
TP-6 during high speed search



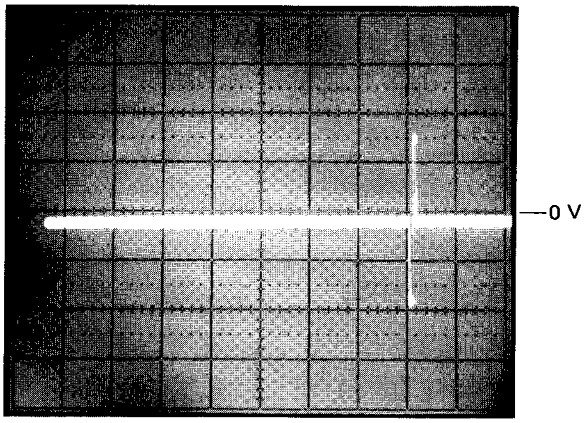
10 ms/div 2 V/div

**15. Kick pulse when searching**

When advancing the track, waveform below is output.



Kick pulse of TP-6 when ▶▶ is used.

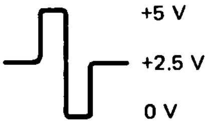


5 ms/div 0.5 V/div

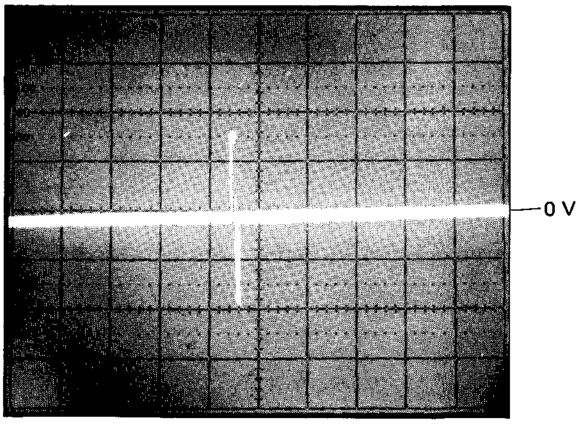
**Note:** Connect an LPF shown below between the test point and an oscilloscope.

**16. Kick pulse when searching**

When returning the track, waveform below is output.

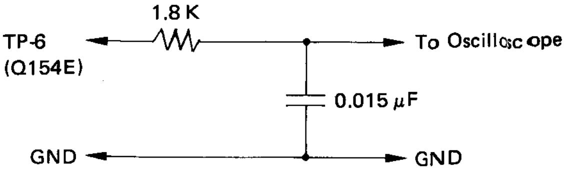


Kick pulse of TP-4 when ◀◀ is used.



5 ms/div 0.5 V/div

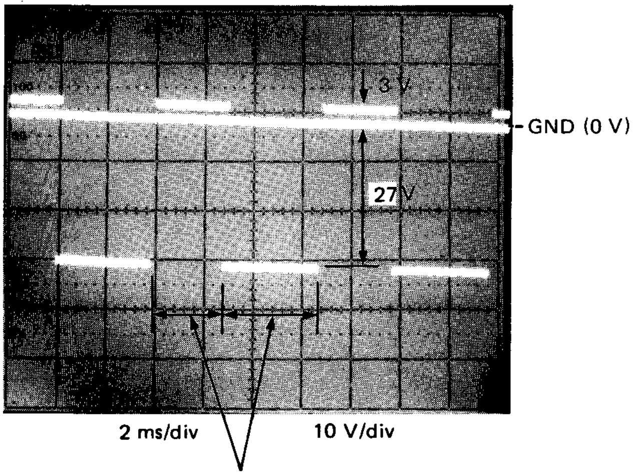
Circuit of LPF



### 17. Part of FL drive waveform

Duty is changed depending on letter indicated.

IC301 Pin ① FL drive waveform (changes depending on the indication)

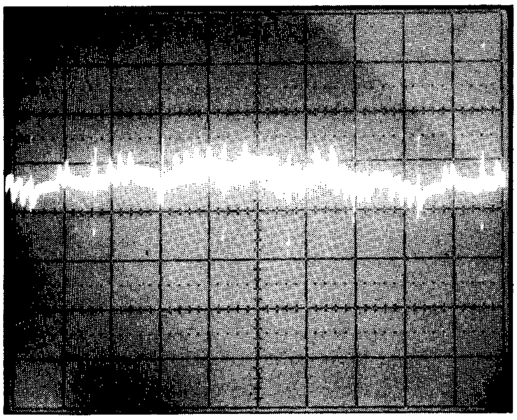


2 ms/div 10 V/div

This width changes.

### 18. Spindle motor drive waveform during play

Spindle motor drive waveform during play (P901 ⑥ pin)

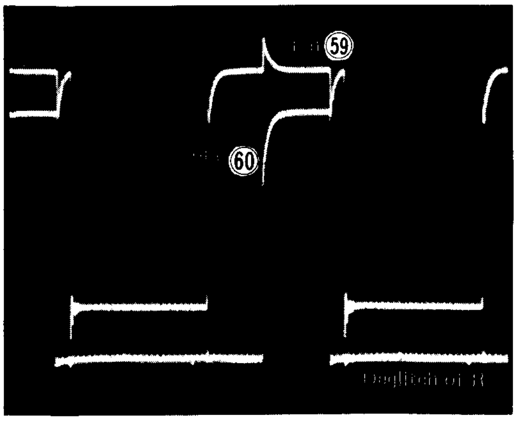


20 ms/div 1.0 V/div (Storage)

### 19. L/R switching signal and deglitch signal of R

R deglitch signal (pin (60) ) is input when switching signal (pin (59) ) is at "H" level.

Waveforms of IC502 Pins (59) and (60)

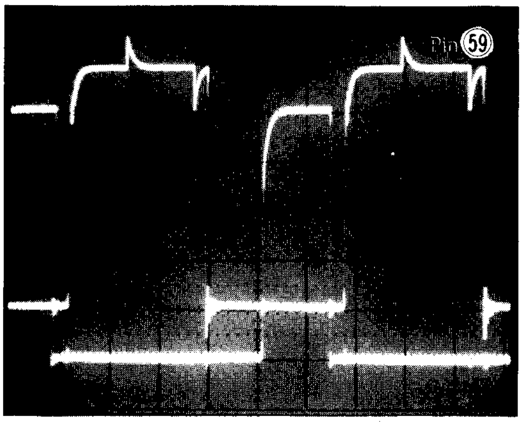


2 µs/div 1 V/div

### 20. L/R switching signal and deglitch signal of L

L deglitch signal (pin (61) ) is input when switching signal (pin (59) ) is at "L" level.

Waveforms of IC502 Pins (59) and (61)



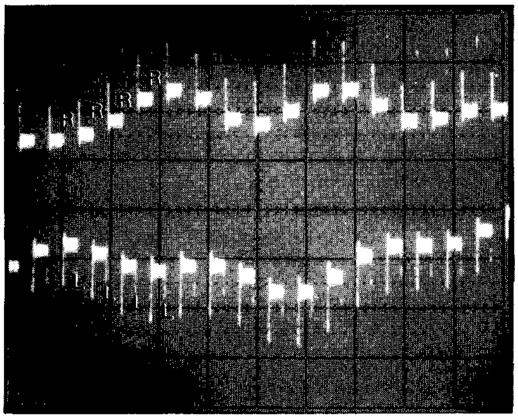
2 µs/div 1 V/div

**Note:** Photos 19 and 20 are shifted by 1 V for better visibility.

### 21. AF signal switched after D/A

Waveform showing that R and L are output alternately.

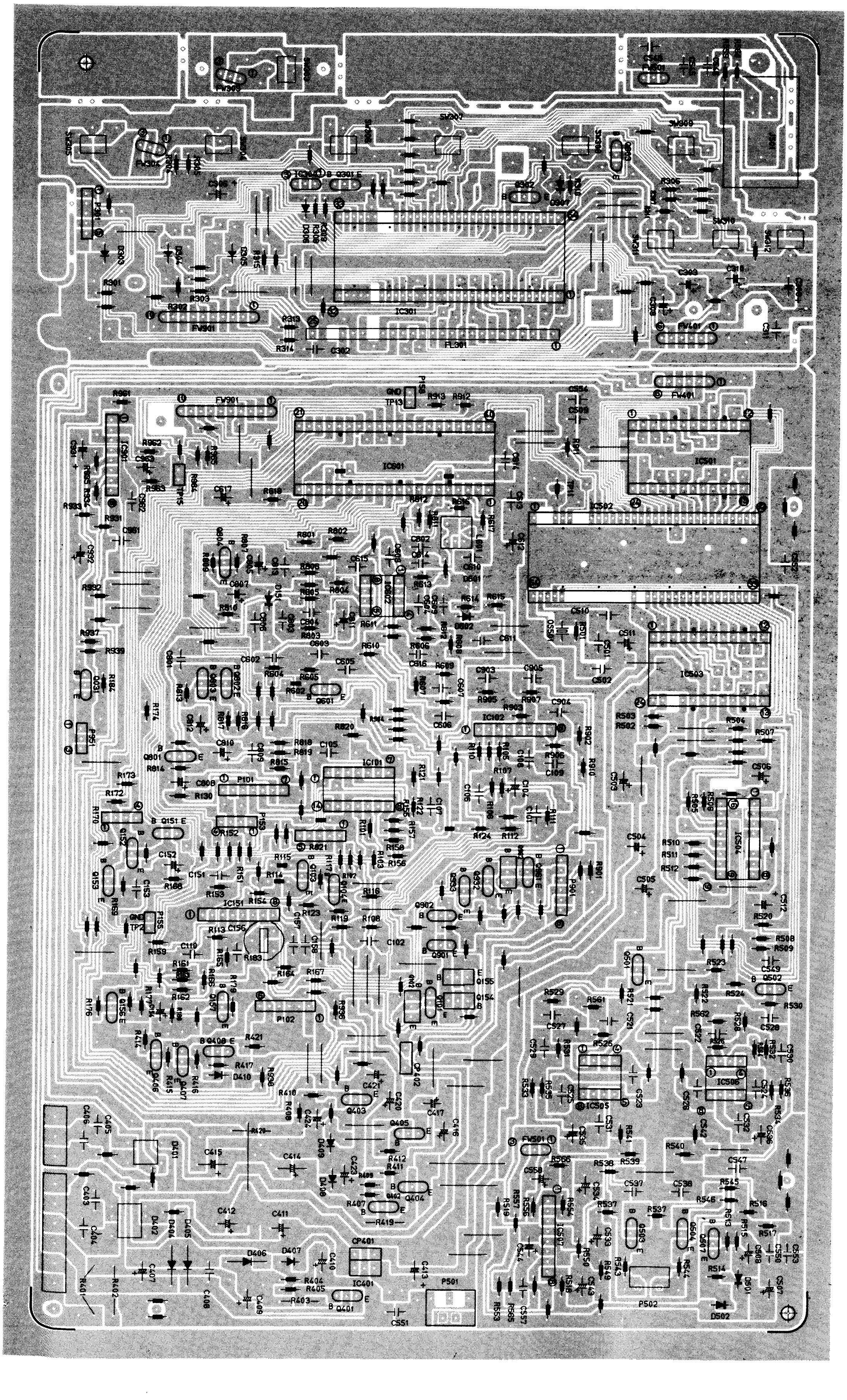
R/L signal switched of IC503 Pin ⑰



20 µs/div 0.5 V/div (Storage)

# 5. Printed Circuit Board

## 5-1 Main P. C. Board and Front P. C. Board


IC301
FL301
FW301
FW401
IC601
FW601
IC501
IC502
IC503
IC504
IC101
IC151
P101
P102
IC505
IC506
FW501
IC401
CP401
CP402
P501
P502
IC507

# PARTS LIST

## SUPPLEMENT

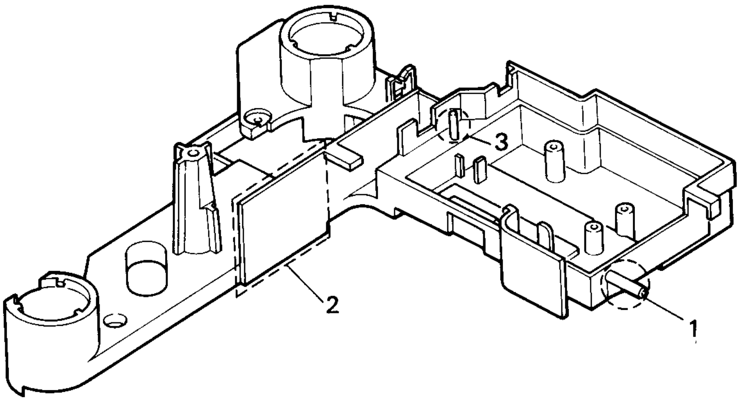
This supplement is compiled to notify revisions and alterations of parts different from those in the parts lists of the Service Manual (No. 2847, July 1985) published already.

When placing an order for parts for replacement, refer to both the Service Manual (No. 2847) and this Supplement in which different parts are printed with screen.

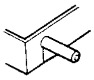
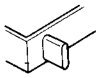
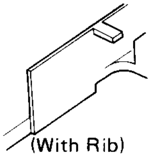
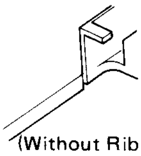
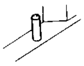
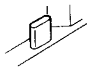
Page
1. How to Distinguish New and Old Parts from Each Other . . . . . . . . . . 2-2
2. Exploded View and Part Numbers . . . . . . . . . . 2-3
3. Mechanism Ass'y . . . . . . . . . . 2-5
4. Printed Circuit Board Ass'y and Parts List
    4-(1) ENN-020☐ Main P.C. Board Ass'y . . . . . . . . . . 2-7
    4-(2) ENN-021A RF P.C. Board Ass'y . . . . . . . . . . 2-12
5. Packing Materials and Part Numbers . . . . . . . . . . 2-13
6. Accessories List . . . . . . . . . . 2-14
7. Additional Parts for West Germany Only . . . . . . . . . . 2-14

# 1. How to Distinguish New and Old Parts from Each Othe

## (1) Stand (R)



**How to distinguish new and old Stand (R)**

| | Modified Part | Old | New |
|---|---|---|---|
| 1 | Boss for inserting to Rear Panel | <br>(Round Boss) | <br>(Oval Boss) |
| 2 | Rib for holding Transf. Wire | <br>(With Rib) | <br>(Without Rib) |
| 3 | Wrapping Part<br>Rib for holding Wire | <br>(Round Boss) | <br>(Oval Boss) |

* Old Stand (R) can be fitted in New Rear Panel but
New Stand (R) cannot be fitted in Old Rear Panel.

**The Marks for Designated Areas**

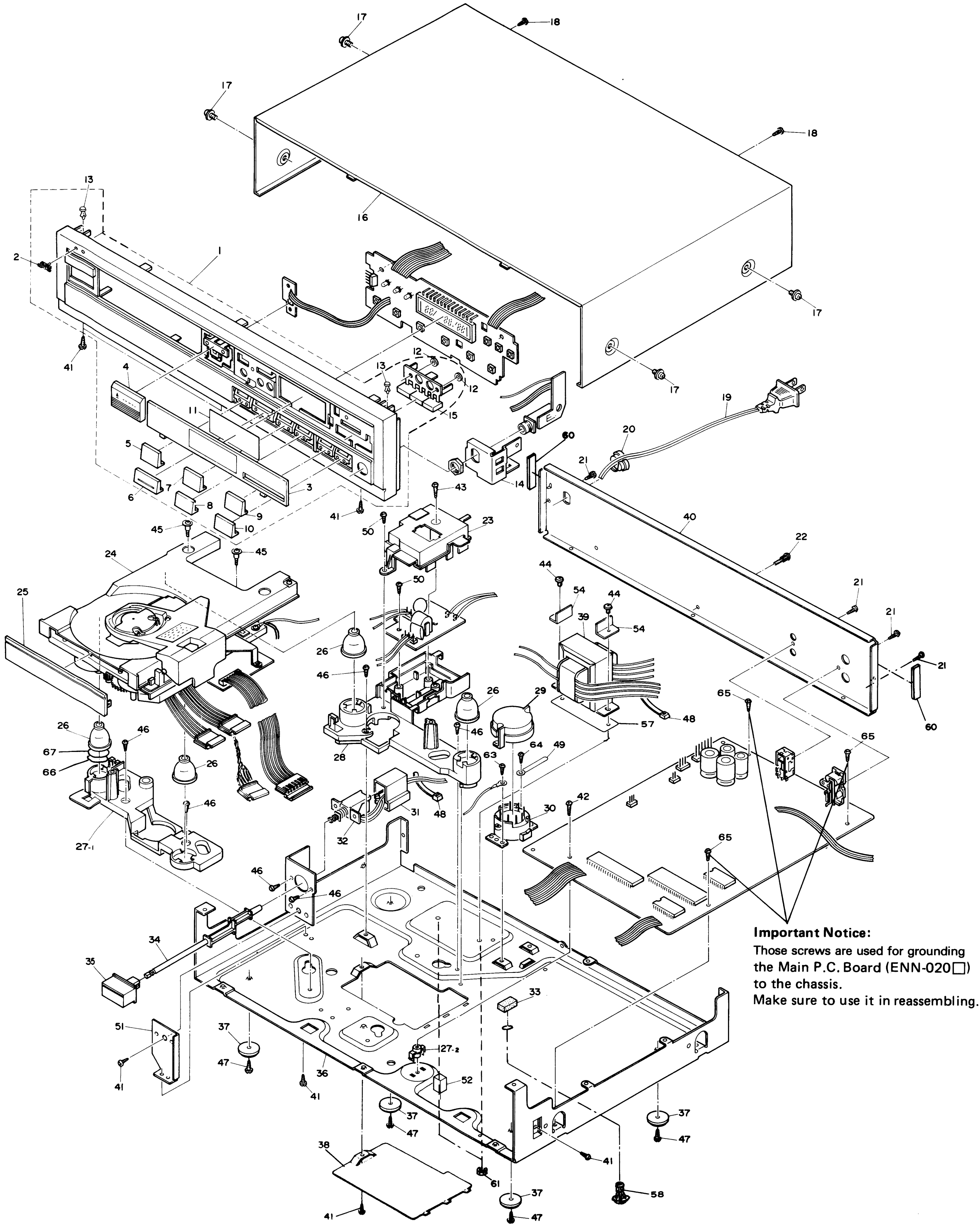
| | |
|---|---|
| J . . . . . . | U.S.A. |
| C . . . . . . | Canada |
| E . . . . . . | Europe |
| A . . . . . . | Australia |
| G . . . . . . | West Germany |
| ES . . . . . | Spain |
| BS . . . . . | U.K. |
| P, PG . . . | U.S. Military Market |
| U . . . . . . | Other Countries |

No mark indicates all areas.

- **Difference List**

| Old | New | Areas |
|---|---|---|
| E11157-001 | E11157-003 | Except J, C |
| E11157-002 | E11157-004 | J, C |

# 2. Exploded View and Parts Numbers



**Important Notice:**
Those screws are used for grounding the Main P.C. Board (ENN-020☐) to the chassis.
Make sure to use it in reassembling.

| ⚠ | Item | Part Number | Part Name | Q'ty | Description | Areas |
|---|---|---|---|---|---|---|
|  | 1 | EFP-XLV200BE | Front Panel Ass'y | 1 |  |  |
|  |  | E11150-006 | Front Panel | 1 |  |  |
|  | 2 | E70913-001 | JVC Mark | 1 |  |  |
|  | 3 | E303835-002 | Window Screen | 1 |  |  |
|  | 4 | E303855-001 | Cap. | 1 | OPEN/CLOSE |  |
|  | 5 | E303837-001 | Cap. | 1 | STOP/CLEAR |  |
|  | 6 | E303837-006 | Cap. | 1 | PLAY/PAUSE |  |
|  | 7 | E303837-002 | Cap. | 1 | ⏮ SKIP |  |
|  | 8 | E303837-003 | Cap. | 1 | SKIP ⏭ |  |
|  | 9 | E303837-004 | Cap. | 1 | ◀◀ SEARCH |  |
|  | 10 | E303837-005 | Cap. | 1 | SEARCH ▶▶ |  |
|  | 11 | E70561-016 | FL. Screen | 1 |  |  |
|  | 12 | E60912-003 | Speed Nut | 2 |  |  |
|  | 13 | E48729-008 | Plastic Rivet | 2 |  |  |
|  | 14 | E303840-001 | H.P. Bracket | 1 | Head Phone Jack |  |
|  | 15 | E303839-001 | Push Button | 1 |  |  |
|  | 16 | E25076-001 | Metal Cover | 1 |  |  |
|  | 17 | E61660-004 | Special Screw | 4 |  |  |
|  | 18 | SHSB3008M | Screw | 2 |  |  |
| ⚠ | 19 | QMP1200-200 | Power Cord | 1 |  | J, C |
| ⚠ |  | QMP2560-244 | Power Cord | 1 |  | A |
| ⚠ |  | QMP3900-200 | Power Cord | 1 |  | E, G, ES |
| ⚠ |  | QMP7600-250 | Power Cord | 1 |  | P, PG, U |
| ⚠ |  | QMP9017-008BS | Power Cord | 1 |  | BS |
| ⚠ | 20 | QHS3876-162 | Cord Stopper | 1 |  | J, C, A, E, G, P, PG, ES, U |
| ⚠ |  | QHS3876-162BS | Cord Stopper | 1 |  | BS |
|  | 21 | SBSE3008M | Screw | 4 |  |  |
|  | 22 | E66052-001 | Special Screw | 1 |  |  |
|  | 23 | E303842-001 | Cover | 1 |  | P, PG, U, E, A, G, ES, BS |
|  |  | E303842-002 | Cover | 1 |  | J, C |
|  | 24 |  | Mechanism Base Unit | 1 |  | See Page 2-5 |
|  | 25 | E303845-005 | Fitting | 1 |  |  |
|  | 26 | E72393-001 | FL. Rubber | 4 |  |  |
|  | 27-1 | E25081-001A | Stand(F) | 1 |  |  |
|  | 27-2 | E25081-001B | C.B. Holder | 1 |  |  |
|  | 28 | E11157-003 | Stand(R) | 1 |  | P, PG, E, A, G, ES, BS, U |
|  |  | E11157-004 | Stand(R) | 1 |  | J, C |
|  | 29 | E302764-001 | Cover | 1 | Voltage Selector | P, PG, U |
| ⚠ | 30 | QSR0085-008U | Voltage Selector | 1 |  | P, PG, U |
| ⚠ | 31 | E71004-001 | Switch Cover | 1 | Power Switch |  |
| ⚠ | 32 | QSP1106-004 | Push Switch | 1 | Power | J, C, P, PG, E, A, G, ES, U |
| ⚠ |  | QSP1106-004BS | Push Switch | 1 | Power | BS |
|  | 33 | E72572-006 | Felt Spacer | 1 |  |  |
|  | 34 | E303854-001 | Push Shaft | 1 | Power |  |
|  | 35 | E72472-002 | Push Knob | 1 | Power |  |
|  | 36 | E11151-005 | Chassis Base | 1 |  | J, C, E, A, G, BS, ES |
|  |  | E11151-006 | Chassis Base | 1 |  | P, PG, U |
|  | 37 | E47227-026 | Foot | 4 |  |  |
|  | 38 | E303841-002 | Bottom Cover | 1 |  |  |
| ⚠ | 39 | ETP1020-11JA | Power Transformer | 1 |  | J, C |
| ⚠ |  | ETP1020-11MA | Power Transformer | 1 |  | P, PG, U |
| ⚠ |  | ETP1020-11EA | Power Transformer | 1 |  | E, A, G, ES |
| ⚠ |  | ETP1020-11EABS | Power Transformer | 1 |  | BS |
|  | 40 | E25078-005 | Rear Panel | 1 |  | J |
|  |  | E25078-006 | Rear Panel | 1 |  | C, P, PG, E, A, G, ES, BS, U |
|  | 41 | SBSE3008N | Screw | 7 |  |  |
|  | 42 | SBSE3012CC | Screw | 1 |  |  |
|  | 43 | SBSF3014Z | Screw | 1 |  |  |
|  | 44 | E65389-006 | Screw | 2 |  |  |
|  | 45 | E72404-002 | Special Screw | 2 |  |  |
|  | 46 | SBST3006Z | Screw | 6 |  |  |
|  | 47 | SDSB3008N | Screw | 4 |  |  |
|  | 48 | E33754-001 | Tie Band | 2 |  |  |
|  | 49 | E72018-001 | Wire Clamp | 1 |  |  |
|  | 50 | SBSF3008Z | Screw | 2 |  |  |
|  | 51 | E72576-001 | Bracket | 1 |  |  |
|  | 54 | E72606-001 | Bracket | 2 | Power Transformer |  |
|  | 57 | E72945-001 | Sheet Ass'y | 1 |  |  |
|  | 60 | E72572-005 | Spacer | 2 |  |  |
|  | 61 | NTS4000Z | Nut | 2 |  |  |
|  | 63 | SBST3006CC | Screw | 1 |  |  |
|  | 64 | SBST3006Z | Screw | 1 |  |  |
|  | 65 | GBSE3008CC | Screw | 3 |  | Washer Screw |
|  | 66 | E72634-001 | Spacer | 1 |  |  |
|  | 67 | E72634-002 | Spacer | 1 |  |  |

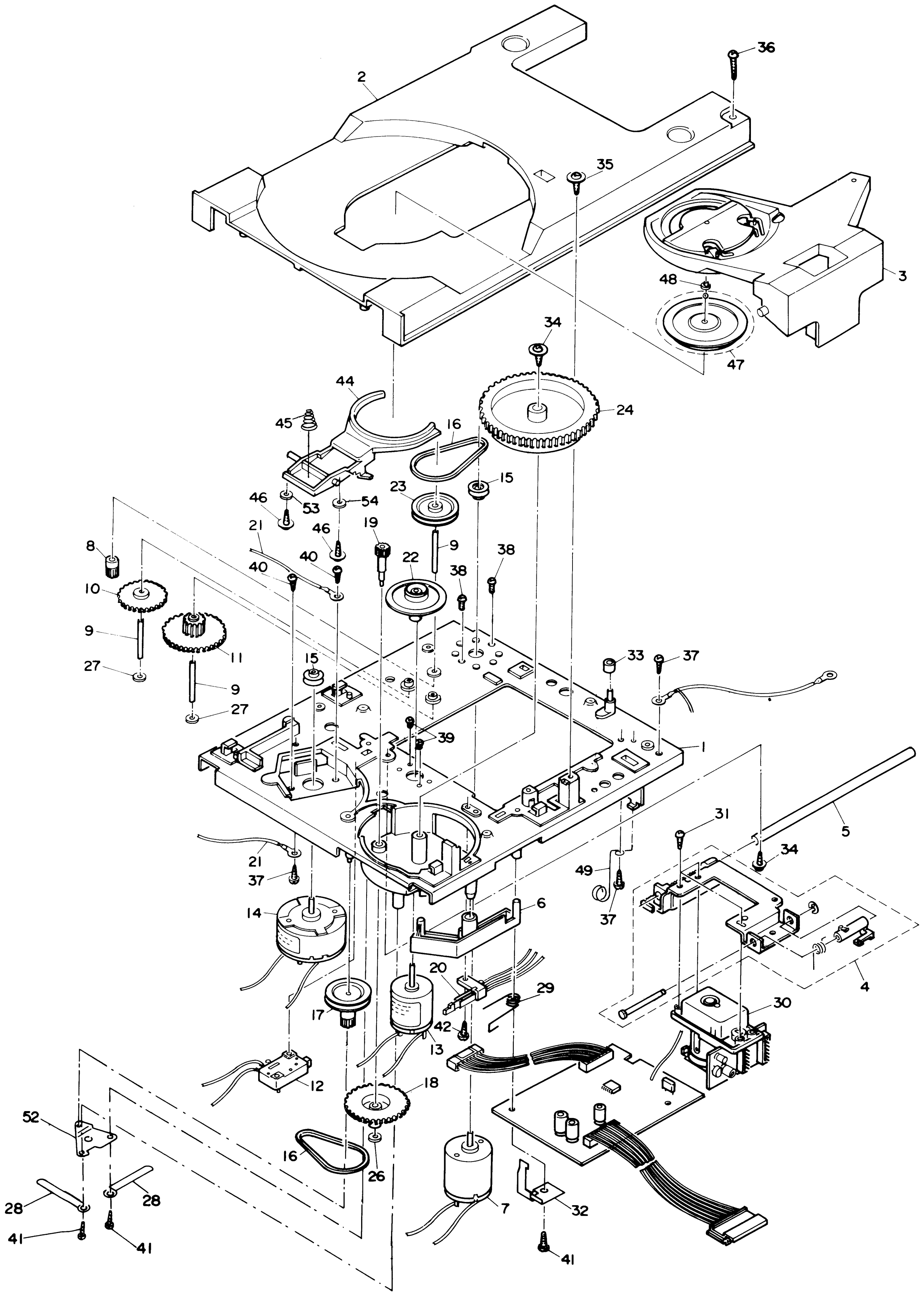
⚠ : Safety Parts

**The Marks for Designated Areas**

J : U.S.A.
C : Canada
A : Australia
E : Europe
G : West Germany
ES : Spain
BS : U.K.
P, PG: U.S. Military Market
U : Other Countries

No Mark indicates all areas.

# 3. Mechanism Ass'y


36
2
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3
48
47
34
24
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16
15
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54
21
46
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7
32
41
41
41

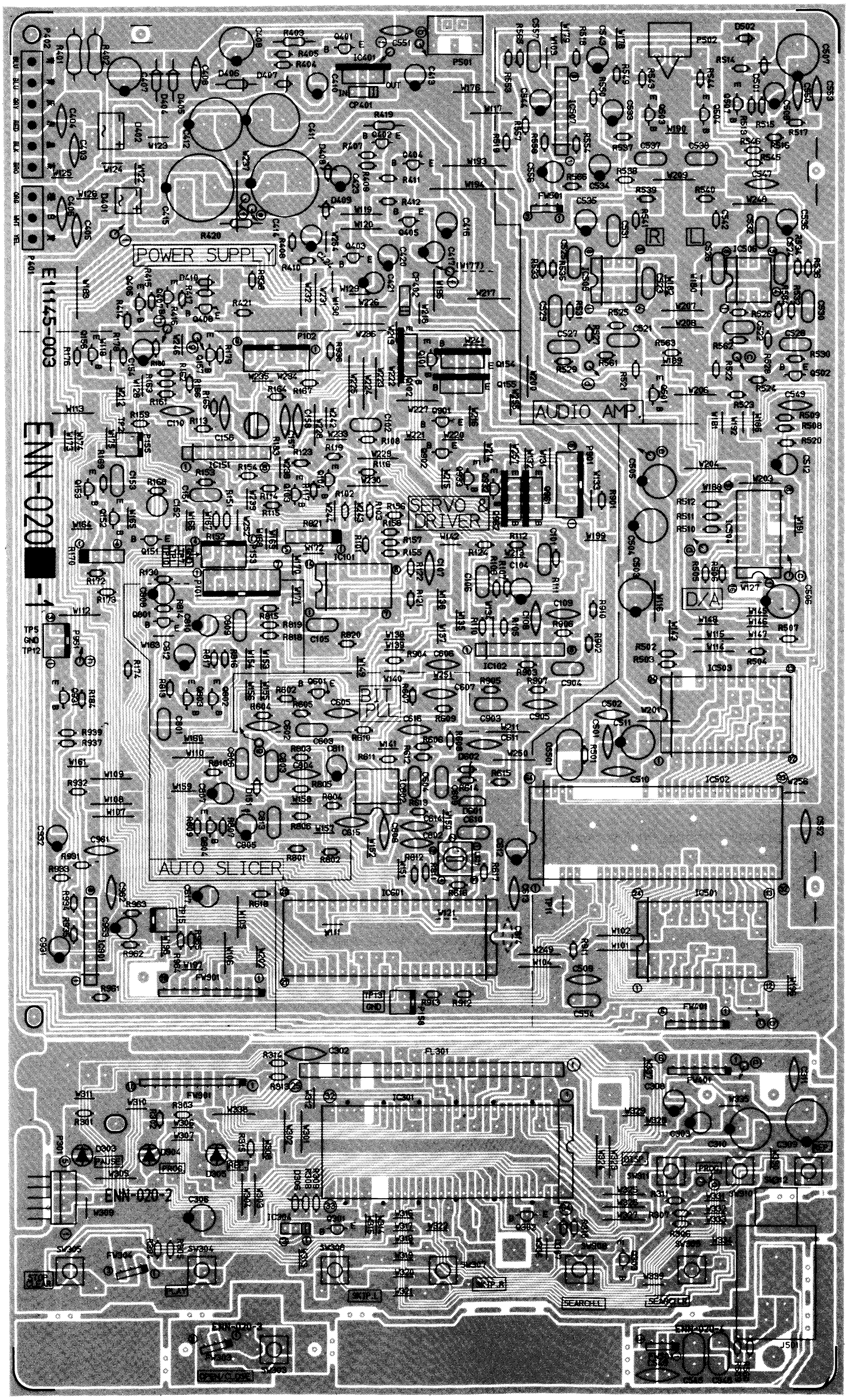
| ⚠ | Item | Part Number | Part Name | Q'ty | Description | Areas |
|---|---|---|---|---|---|---|
| | 1 | E11148-004 | Base Ass'y | 1 | | |
| | 2 | E11149-001 | Tray | 1 | | |
| | 3 | E25068-002 | Holder | 1 | | |
| | 4 | E72410-003 | Pick-up Base Unit | 1 | | |
| | 5 | E71742-002 | Feed Shaft | 1 | | |
| | 6 | E303831-002 | Lever | 1 | | |
| | 7 | RF-260T-08450 | Motor | 1 | | |
| | 8 | E71733-002 | Feed Gear (A) | 1 | | |
| | 9 | E71731-002 | Shaft | 3 | | |
| | 10 | E71734-002 | Feed Gear (B) | 1 | | |
| | 11 | E303542-002 | Feed Gear (C) | 1 | | |
| | 12 | QSS1214-002 | Slide Push Switch | 1 | | |
| | 13 | VA612R53 | Motor | 1 | | |
| | 14 | E71569-001 | Motor | 1 | | |
| | 15 | E72376-001 | M. Pulley | 2 | | |
| | 16 | E69879-002 | Belt | 2 | | |
| | 17 | E72375-001 | Pulley (A) | 1 | | |
| | 18 | E72377-003 | Gear (Y) | 1 | | |
| | 19 | E72378-001 | Gear (X) | 1 | | |
| | 20 | ESB1200-001 | Leaf Switch | 1 | | |
| | 21 | EWT021-017 | Terminal Wire Ass'y | 1 | | |
| | 22 | E72379-001 | Turn Table | 1 | | |
| | 23 | E72392-001 | Pulley (B) | 1 | | |
| | 24 | E25064-003 | Main Gear | 1 | | |
| | 26 | E60912-001 | Speed Nut | 1 | | |
| | 27 | E72024-001 | Speed Nut | 2 | | |
| | 28 | E50670-005 | Wire Clamp | 2 | | |
| | 29 | E72382-001 | Tor Spring | 1 | | |
| | 30 | E303991-001 | Laser Pick Up Ass'y | 1 | | |
| | 31 | SPSP2605N | Screw | 3 | | |
| | 32 | E72586-001 | Spacer | 1 | | |
| | 33 | E70267-003 | R. Tube | 1 | | |
| | 34 | E65923-003 | Screw | 2 | | |
| | 35 | E65923-004 | Screw | 1 | | |
| | 36 | SBSF3014Z | Screw | 1 | | |
| | 37 | SBSE3008CC | Screw | 3 | | |
| | 38 | E72963-268 | Screw | 2 | | |
| | 39 | E72963-203 | Screw | 2 | | |
| | 40 | SDSP2604N | Screw | 2 | | |
| | 41 | SBSF3008Z | Screw | 3 | | |
| | 42 | SPSF2608Z | Screw | 1 | | |
| | 44 | E303832-003 | Lifter | 1 | | |
| | 45 | E72728-001 | Spring | 1 | | |
| | 46 | E72405-001 | Special Screw | 2 | | |
| | 47 | E72380-004 | Clamper Ass'y | 1 | | |
| | 48 | E72408-001 | Spacer | 1 | | |
| | 49 | E72562-001 | Wire Holder | 1 | | |
| | 52 | E72624-001 | Gear Bracket | 1 | | |
| | 53 | Q03093-827 | Washer | 1 | | |
| | 54 | Q03093-834 | Washer | 1 | | |

⚠ : Safety Parts

# 4. Printed Circuit Board Ass'y and Parts List

## 4-(1) ENN-020☐ Main P. C. Board Ass'y

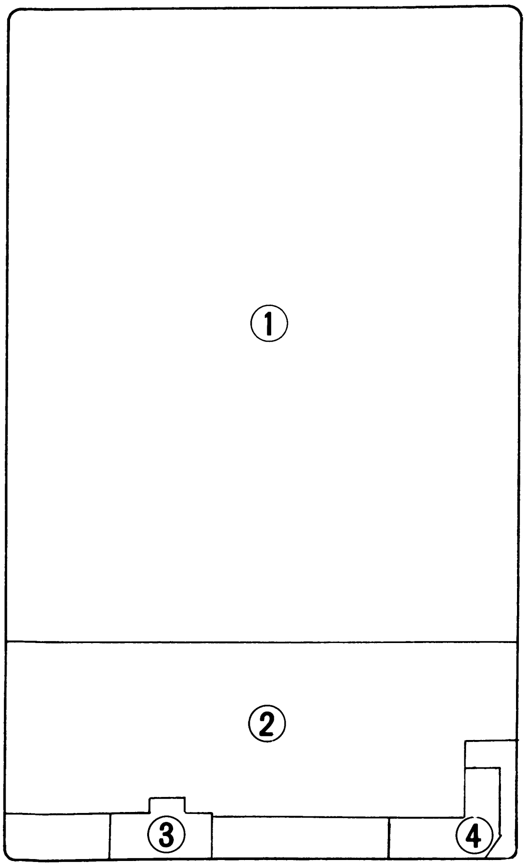
Note: ENN-020☐Varies according to the areas employed. See note (1) when placing an order.


POWER SUPPLY
E11145-003
ENN-020■-1
AUDIO AMP
SERVO & DRIVER
D/A
BIT PLL
AUTO SLICER
IC501
IC502
IC503
IC301
FL301
ENN-020-2
PAUSE
PLAY
SKIP.L
SKIP.R
SEARCH.L
SEARCH.R
TP5
GND
TP12
TP13
GND
P401
P501
P502
R
L

Note (1)

| P.C. Board Ass'y | Designated Areas |
|---|---|
| ENN-020B | Canada |
| ENN-020E | U.S.A., Europe, Australia, Spain, U.K., U.S. Military Market & Other Countries |
| ENN-020Z | West Germany |

## Each Individual P. C. Board Location



① ENN-020-1
Main P.C. Board

② ENN-020-2
Front P.C. Board

③ ENN-020-3
Switch P.C. Board

④ ENN-020-4
Head Phone P.C. Board

TRANSITORS

| ⚠ | ITEM | PART NUMBER | DESCRIPTION | | AREA |
|---|---|---|---|---|---|
| | | | | MAKER | |
| | Q101 | 2SD400MP(E,F) | SILICON | SANYO | |
| | Q102 | 2SB507V(D,E) | SILICON | SANYO | |
| | Q103 | 2SD1302(S,T) | SILICON | MATSUSHITA | |
| | Q104 | 2SA1029(C,D) | SILICON | HITACHI | |
| | Q151 | 2SD1302(S,T) | SILICON | MATSUSHITA | |
| | Q152 | 2SD1302(S,T) | SILICON | MATSUSHITA | |
| | Q153 | 2SD1302(S,T) | SILICON | MATSUSHITA | |
| | Q154 | 2SD313V(D,E) | SILICON | SANYO | |
| | Q155 | 2SB507V(D,E) | SILICON | SANYO | |
| | Q156 | 2SA1029(C,D) | SILICON | HITACHI | |
| | Q157 | 2SC458(C,D) | SILICON | HITACHI | |
| | Q301 | DTC114YN | SILICON | ROHM | |
| | Q302 | DTA114YN | SILICON | ROHM | |
| | Q303 | DTC144EN | SILICON | ROHM | |
| | Q401 | 2SA733A(P,Q) | SILICON | NEC | |
| | Q402 | 2SD400MP(E,F) | SILICON | SANYO | |
| | Q403 | 2SB544MP(E,F) | SILICON | SANYO | |
| | Q404 | 2SD400MP(E,F) | SILICON | SANYO | |
| | Q405 | 2SB544MP(E,F) | SILICON | SANYO | |
| | Q406 | 2SA1029(C,D) | SILICON | HITACHI | |
| | Q407 | 2SA1029(C,D) | SILICON | HITACHI | |
| | Q408 | 2SD400MP(E,F) | SILICON | SANYO | |
| | Q501 | 2SD1302(S,T) | SILICON | MATSUSHITA | |
| | Q502 | 2SD1302(S,T) | SILICON | MATSUSHITA | |
| | Q503 | 2SD1302(S,T) | SILICON | MATSUSHITA | |
| | Q504 | 2SD1302(S,T) | SILICON | MATSUSHITA | |
| | Q507 | 2SA1029(C,D) | SILICON | HITACHI | |
| | Q601 | 2SD1302(S,T) | SILICON | MATSUSHITA | |
| | Q801 | 2SA1029(C,D) | SILICON | HITACHI | |
| | Q802 | 2SC458(C,D) | SILICON | HITACHI | |
| | Q803 | 2SC458(C,D) | SILICON | HITACHI | |
| | Q804 | 2SD1302(S,T) | SILICON | MATSUSHITA | |
| | Q901 | 2SD400MP(E,F) | SILICON | SANYO | |
| | Q902 | 2SB544MP(E,F) | SILICON | SANYO | |
| | Q931 | 2SD1302(S,T) | SILICON | MATSUSHITA | |
| | Q932 | 2SD400MP(E,F) | SILICON | SANYO | |
| | Q933 | 2SB544MP(E,F) | SILICON | SANYO | |
| | Q961 | 2SD313V(D,E) | SILICON | SANYO | |
| | Q962 | 2SB507V(D,E) | SILICON | SANYO | |

I. C. S

| ⚠ | ITEM | PART NUMBER | DESCRIPTION | | AREA |
|---|---|---|---|---|---|
| | | | | MAKER | |
| | IC101 | NJM2901N | I.C. | | |
| | IC102 | M5218L | I.C. | MITSUBISHI | |
| | IC151 | M5218L | I.C. | MITSUBISHI | |
| | IC301 | HD614042SD56 | I.C. | HITACHI | |
| | IC304 | MN1280(P,Q) | I.C. | MATSUSHITA | |
| | IC401 | NJM78M05A | I.C. | | |
| | IC501 | UPD446C-2 | I.C. | NEC | |
| | IC502 | YM2601K | I.C. | NIHONGAKKI | |
| | IC503 | PCM53JP-V | I.C. | JAPAN B.B | |
| | IC503 | PCM53JP-V-2 | I.C. | JAPAN B.B | |
| | IC504 | BU4053B | I.C. | ROHM | |
| | IC505 | NJM4560DD | I.C. | JRC | |
| | IC506 | NJM4560DD | I.C. | JRC | |
| | IC507 | M5218L | I.C. | MITSUBISHI | |
| | IC601 | YM3811 | I.C. | NIHON GAKKI | |
| | IC602 | M5219P | I.C. | MITSUBISHI | |
| | IC901 | M5218L | I.C. | MITSUBISHI | |

⚠ : SAFETY PARTS

## DIODES

| ⚠ | ITEM | PART NUMBER | DESCRIPTION | MAKER | AREA |
|---|---|---|---|---|---|
| | D151 | 1SS133 | SILICON | ROHM | |
| | D303 | SLH-56VC50F130 | L.E.D. | ROHM | |
| | D304 | SLH-56VC50F130 | L.E.D. | ROHM | |
| | D305 | SLH-56VC50F130 | L.E.D. | ROHM | |
| | D306 | 1SS133 | SILICON | ROHM | |
| | D307 | 1SS133 | SILICON | ROHM | |
| | D401 | 1D4B42 | SILICON | TOSHIBA | |
| | D402 | S1WB(A)20 | SILICON | ROHM | |
| | D404 | 10E2FD-1 | SILICON | NIHONINTER | |
| | D405 | 10E2FD-1 | SILICON | NIHONINTER | |
| | D406 | 10E2FD-1 | SILICON | NIHONINTER | |
| | D407 | MTZ30A | ZENER | ROHM | |
| | D408 | MTZ13C | ZENER | ROHM | |
| | D409 | MTZ13C | ZENER | ROHM | |
| | D410 | MTZ8.2C | ZENER | ROHM | |
| | D501 | 1SS133 | SILICON | ROHM | |
| | D502 | 1SS133 | SILICON | ROHM | |
| | D601 | SVC321SP-AW | VARICAP | SANYO | |
| | D602 | MTZ5.6C | ZENER | ROHM | |

## CAPACITORS

| ⚠ | ITEM | PART NUMBER | DESCRIPTION | | | AREA |
|---|---|---|---|---|---|---|
| | C101 | QFN81HJ-104 | 0.1MF | 50V | MYLAR | |
| | C102 | QFN81HJ-273 | 0.027MF | 50V | MYLAR | |
| | C104 | QETB1CM-226 | 22MF | 16V | ELECTRO | |
| | C105 | QFV81HJ-224 | 0.22MF | 50V | T.FILM | |
| | C106 | QCS21HJ-471 | 470PF | 50V | CERAMIC | |
| | C107 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C108 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C109 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C110 | QCS21HJ-101 | 100PF | 50V | CERAMIC | |
| | C151 | QFN81HJ-273 | 0.027MF | 50V | MYLAR | |
| | C152 | QEN51HM-105 | 1MF | 50V | NON POLE | |
| | C153 | QFN81HJ-273 | 0.027MF | 50V | MYLAR | |
| | C154 | QETB1EM-106 | 10MF | 25V | ELECTRO | |
| | C156 | QCS21HJ-100 | 10PF | 50V | CERAMIC | |
| | C157 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C158 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C302 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C303 | QEK61HM-475 | 4.7MF | 50V | ELECTRO | |
| | C306 | QETB1AM-107 | 100MF | 10V | ELECTRO | |
| | C308 | QEK61HM-475 | 4.7MF | 50V | ELECTRO | |
| | C309 | QEU51CM-227 | 220MF | 16V | ELECTRO | |
| | C310 | QEU51VM-107 | 100MF | 35V | ELECTRO | |
| | C311 | QCS21HJ-471 | 470PF | 50V | CERAMIC | |
| | C403 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C404 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C405 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C406 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C407 | QETB1HM-107 | 100MF | 50V | ELECTRO | |
| | C408 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C409 | QETB1HM-107 | 100MF | 50V | ELECTRO | |
| | C410 | QETB1HM-475 | 4.7MF | 50V | ELECTRO | |
| | C411 | QETB1CM-228 | 2200MF | 16V | ELECTRO | |
| | C412 | QETB1CM-228 | 2200MF | 16V | ELECTRO | |
| | C413 | QETB1AM-107 | 100MF | 10V | ELECTRO | |
| | C414 | QETB1EM-228 | 2200MF | 25V | ELECTRO | |
| | C415 | QETB1EM-228 | 2200MF | 25V | ELECTRO | |
| | C416 | QETB1CM-476 | 47MF | 16V | ELECTRO | |
| | C417 | QETB1CM-476 | 47MF | 16V | ELECTRO | |
| | C420 | QETB1CM-476 | 47MF | 16V | ELECTRO | |
| | C421 | QETB1CM-476 | 47MF | 16V | ELECTRO | |
| | C423 | QETB1EM-476 | 47MF | 25V | ELECTRO | |
| | C424 | QETB1EM-476 | 47MF | 25V | ELECTRO | |
| | C501 | QCS21HJ-100 | 10PF | 50V | CERAMIC | |
| | C502 | QCS21HJ-100 | 10PF | 50V | CERAMIC | |
| | C503 | QETB0JM-227 | 220MF | 6.3V | ELECTRO | |
| | C504 | QETB1CM-227 | 220MF | 16V | ELECTRO | |
| | C505 | QETB1CM-227 | 220MF | 16V | ELECTRO | |
| | C506 | QETB0JM-227 | 220MF | 6.3V | ELECTRO | |
| | C507 | QETB1CM-227 | 220MF | 16V | ELECTRO | |
| | C508 | QETB1CM-476 | 47MF | 16V | ELECTRO | |
| | C509 | QCC21EM-473 | 0.047MF | 25V | CERAMIC | |
| | C510 | QCF21HP-473 | 0.047MF | 50V | CERAMIC | |
| | C511 | QETB0JM-477 | 470MF | 6.3V | ELECTRO | |
| | C512 | QETB1CM-227 | 220MF | 16V | ELECTRO | |
| | C521 | QFP81HJ-271 | 270PF | 50V | POLY | |
| | C522 | QFP81HJ-271 | 270PF | 50V | POLY | |
| | C523 | QFN81HJ-104 | 0.1MF | 50V | MYLAR | |
| | C524 | QFN81HJ-104 | 0.1MF | 50V | MYLAR | |
| | C525 | QFN81HJ-104 | 0.1MF | 50V | MYLAR | |
| | C526 | QFN81HJ-104 | 0.1MF | 50V | MYLAR | |
| | C527 | QFN81HJ-473 | 0.047MF | 50V | MYLAR | |
| | C528 | QFN81HJ-473 | 0.047MF | 50V | MYLAR | |
| | C529 | QFN81HJ-123 | 0.012MF | 50V | MYLAR | |
| | C530 | QFN81HJ-123 | 0.012MF | 50V | MYLAR | |
| | C531 | QFP81HJ-271 | 270PF | 50V | POLY | |
| | C532 | QFP81HJ-271 | 270PF | 50V | POLY | |
| | C533 | QETB1HM-105 | 1MF | 50V | ELECTRO | |
| | C534 | QETB1HM-105 | 1MF | 50V | ELECTRO | |
| | C535 | QETB1EM-476 | 47MF | 25V | ELECTRO | |
| | C536 | QETB1EM-476 | 47MF | 25V | ELECTRO | |
| | C537 | QFN81HJ-822 | 8200PF | 50V | MYLAR | |
| | C538 | QFN81HJ-822 | 8200PF | 50V | MYLAR | |
| | C543 | QETB1EM-226 | 22MF | 25V | ELECTRO | |
| | C544 | QETB1EM-226 | 22MF | 25V | ELECTRO | |
| | C545 | QFN81HJ-103 | 0.01MF | 50V | MYLAR | |
| | C546 | QFN81HJ-103 | 0.01MF | 50V | MYLAR | |
| | C547 | QCF21HP-103 | 0.01MF | 50V | CERAMIC | |
| | C548 | QCF21HP-103 | 0.01MF | 50V | CERAMIC | |
| | C549 | QCF21HP-103 | 0.01MF | 50V | CERAMIC | |
| | C550 | QCF21HP-103 | 0.01MF | 50V | CERAMIC | |
| | C551 | QCS21HJ-470 | 47PF | 50V | CERAMIC | |
| | C552 | QCC21EM-473 | 0.047MF | 25V | CERAMIC | |
| | C553 | QCF21HP-103 | 0.01MF | 50V | CERAMIC | |
| | C554 | QFN81HJ-104 | 0.1MF | 50V | MYLAR | |
| | C555 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C602 | QFN81HJ-103 | 0.01MF | 50V | MYLAR | |
| | C603 | QFV81HJ-224 | 0.22MF | 50V | T.FILM | |
| | C604 | QFN81HJ-273 | 0.027MF | 50V | MYLAR | |
| | C605 | QCS21HJ-471 | 470PF | 50V | CERAMIC | |
| | C606 | QCS21HJ-471 | 470PF | 50V | CERAMIC | |
| | C607 | QCF21HP-473 | 0.047MF | 50V | CERAMIC | |
| | C608 | QCS21HJ-100 | 10PF | 50V | CERAMIC | |
| | C609 | QFP81HJ-471 | 470PF | 50V | POLY | |
| | C610 | QFP81HJ-151 | 150PF | 50V | POLY | |
| | C611 | QCF21HP-473 | 0.047MF | 50V | CERAMIC | |
| | C612 | QETB1CM-476 | 47MF | 16V | ELECTRO | |
| | C613 | QCF21HP-473 | 0.047MF | 50V | CERAMIC | |
| | C614 | QCF21HP-473 | 0.047MF | 50V | CERAMIC | |
| | C615 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C616 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C617 | QETB1HM-474 | 0.47MF | 50V | ELECTRO | |
| | C650 | QCS21HJ-180 | 18PF | 50V | CERAMIC | |
| | C801 | QFV81HJ-224 | 0.22MF | 50V | T.FILM | |
| | C802 | QCS21HJ-151 | 150PF | 50V | CERAMIC | |
| | C803 | QFN81HJ-103 | 0.01MF | 50V | MYLAR | |
| | C804 | QCS21HJ-681 | 680PF | 50V | CERAMIC | |
| | C805 | QETB1HM-475 | 4.7MF | 50V | ELECTRO | |
| | C806 | QFN81HJ-222 | 2200PF | 50V | MYLAR | |
| | C807 | QETB1EM-106 | 10MF | 25V | ELECTRO | |
| | C808 | QETB1EM-106 | 10MF | 25V | ELECTRO | |
| | C809 | QFN81HJ-473 | 0.047MF | 50V | MYLAR | |
| | C810 | QETB1EM-106 | 10MF | 25V | ELECTRO | |
| | C811 | QETB1EM-106 | 10MF | 25V | ELECTRO | |
| | C812 | QETB1CM-107 | 100MF | 16V | ELECTRO | |
| | C813 | QFN81HJ-103 | 0.01MF | 50V | MYLAR | |
| | C903 | QFN81HJ-272 | 2700PF | 50V | MYLAR | |
| | C904 | QFV81HJ-224 | 0.22MF | 50V | T.FILM | |
| | C905 | QCS21HJ-820 | 82PF | 50V | CERAMIC | |
| | C931 | QETB1EM-106 | 10MF | 25V | ELECTRO | |
| | C932 | QETB0JM-227 | 220MF | 6.3V | ELECTRO | |
| | C961 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C962 | QCF21HP-223 | 0.022MF | 50V | CERAMIC | |
| | C963 | QETB1EM-106 | 10MF | 25V | ELECTRO | |

⚠ : SAFETY PARTS

## RESISTORS

| ⚠ | ITEM | PART NUMBER | DESCRIPTION | | | AREA |
|---|---|---|---|---|---|---|
| | R101 | QRD161J-562 | 5.6K | 1/6W | CARBON | |
| | R102 | QRD161J-822 | 8.2K | 1/6W | CARBON | |
| | R103 | QRD161J-104 | 100K | 1/6W | CARBON | |
| | R105 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R106 | QRD161J-471 | 470 | 1/6W | CARBON | |
| | R107 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R108 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R110 | QRD161J-470 | 47 | 1/6W | CARBON | |
| | R111 | QRD161J-154 | 150K | 1/6W | CARBON | |
| | R112 | QRD161J-274 | 270K | 1/6W | CARBON | |
| | R113 | QRD161J-155 | 1.5M | 1/6W | CARBON | |
| | R114 | QRD161J-102 | 1K | 1/6W | CARBON | |
| | R115 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R116 | QRD161J-104 | 100K | 1/6W | CARBON | |
| | R117 | QRD161J-272 | 2.7K | 1/6W | CARBON | |
| | R119 | QRD161J-470 | 47 | 1/6W | CARBON | |
| | R121 | QRD161J-104 | 100K | 1/6W | CARBON | |
| | R122 | QRD161J-472 | 4.7K | 1/6W | CARBON | |
| | R123 | QRD161J-473 | 47K | 1/6W | CARBON | |
| | R124 | QRD161J-155 | 1.5M | 1/6W | CARBON | |
| | R130 | QRD161J-114 | 110K | 1/6W | CARBON | |
| | R151 | QRD161J-821 | 820 | 1/6W | CARBON | |
| | R152 | QRD161J-223 | 22K | 1/6W | CARBON | |
| | R153 | QRD161J-153 | 15K | 1/6W | CARBON | |
| | R154 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R155 | QRD161J-562 | 5.6K | 1/6W | CARBON | |
| | R156 | QRD161J-562 | 5.6K | 1/6W | CARBON | |
| | R157 | QRD161J-562 | 5.6K | 1/6W | CARBON | |
| | R158 | QRD161J-562 | 5.6K | 1/6W | CARBON | |
| | R159 | QRD161J-223 | 22K | 1/6W | CARBON | |
| | R161 | QRD161J-223 | 22K | 1/6W | CARBON | |
| | R162 | QRD161J-334 | 330K | 1/6W | CARBON | |
| | R163 | QRD161J-334 | 330K | 1/6W | CARBON | |
| | R164 | QRD161J-332 | 3.3K | 1/6W | CARBON | |
| | R165 | QRD161J-184 | 180K | 1/6W | CARBON | |
| | R166 | QRD161J-203 | 20K | 1/6W | CARBON | |
| | R167 | QRD161J-470 | 47 | 1/6W | CARBON | |
| | R168 | QRD161J-182 | 1.8K | 1/6W | CARBON | |
| | R169 | QRD161J-182 | 1.8K | 1/6W | CARBON | |
| | R170 | QRB035J-104 | 100K | 3W | R.NETWORK | |
| | R172 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R173 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R174 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R176 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R178 | QRD161J-104 | 100K | 1/6W | CARBON | |
| | R179 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R180 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R183 | QVZ3518-472 | | | VARIABLE | |
| | R184 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R301 | QRD161J-331 | 330 | 1/6W | CARBON | |
| | R302 | QRD161J-331 | 330 | 1/6W | CARBON | |
| | R303 | QRD161J-331 | 330 | 1/6W | CARBON | |
| | R304 | QRD161J-334 | 330K | 1/6W | CARBON | |
| | R305 | QRD161J-334 | 330K | 1/6W | CARBON | |
| | R306 | QRD161J-334 | 330K | 1/6W | CARBON | |
| | R307 | QRD161J-334 | 330K | 1/6W | CARBON | |
| | R308 | QRD161J-821 | 820 | 1/6W | CARBON | |
| | R309 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R310 | QRD161J-472 | 4.7K | 1/6W | CARBON | |
| | R311 | QRD161J-121 | 120 | 1/6W | CARBON | |
| | R313 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R314 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R315 | QRD161J-181 | 180 | 1/6W | CARBON | |
| ⚠ | R401 | QRD125J-102 | 1K | 1/2W | UNF.CARBON | |
| ⚠ | R402 | QRD125J-102 | 1K | 1/2W | UNF.CARBON | |
| ⚠ | R403 | QRZ0062-560 | 56 | 1/4W | FUSIBLE | |
| | R404 | QRD161J-123 | 12K | 1/6W | CARBON | |
| | R405 | QRD161J-121 | 120 | 1/6W | CARBON | |
| | R407 | QRD161J-122 | 1.2K | 1/6W | CARBON | |
| | R408 | QRD161J-122 | 1.2K | 1/6W | CARBON | |
| | R409 | QRD161J-121 | 120 | 1/6W | CARBON | |
| | R410 | QRD161J-121 | 120 | 1/6W | CARBON | |
| | R411 | QRD161J-121 | 120 | 1/6W | CARBON | |
| | R412 | QRD161J-121 | 120 | 1/6W | CARBON | |
| | R414 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R415 | QRD161J-681 | 680 | 1/6W | CARBON | |
| | R416 | QRD161J-102 | 1K | 1/6W | CARBON | |
| | R417 | QRD161J-103 | 10K | 1/6W | CARBON | |
| ⚠ | R419 | QRZ0062-100 | 10 | 1/4W | FUSIBLE | |
| ⚠ | R420 | QRZ0062-100 | 10 | 1/4W | FUSIBLE | |
| | R421 | QRD161J-182 | 1.8K | 1/6W | CARBON | |
| | R501 | QRD161J-105 | 1M | 1/6W | CARBON | |
| | R502 | QRD161J-123 | 12K | 1/6W | CARBON | |
| | R503 | QRD161J-105 | 1M | 1/6W | CARBON | |
| | R504 | QRD161J-273 | 27K | 1/6W | CARBON | |
| | R505 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R506 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R507 | QRD161J-101 | 100 | 1/6W | CARBON | |
| | R508 | QRD161J-104 | 100K | 1/6W | CARBON | |
| | R509 | QRD161J-124 | 120K | 1/6W | CARBON | |
| | R510 | QRD161J-472 | 4.7K | 1/6W | CARBON | |
| | R511 | QRD161J-472 | 4.7K | 1/6W | CARBON | |
| | R512 | QRD161J-472 | 4.7K | 1/6W | CARBON | |
| | R513 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R514 | QRD161J-680 | 68 | 1/6W | CARBON | |
| | R515 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R516 | QRD161J-334 | 330K | 1/6W | CARBON | |
| | R517 | QRD161J-684 | 680K | 1/6W | CARBON | |
| | R518 | QRD161J-271 | 270 | 1/6W | CARBON | |
| | R519 | QRD161J-271 | 270 | 1/6W | CARBON | |
| | R520 | QRD161J-101 | 100 | 1/6W | CARBON | |
| | R521 | QRD161J-822 | 8.2K | 1/6W | CARBON | |
| | R522 | QRD161J-822 | 8.2K | 1/6W | CARBON | |
| | R523 | QRD161J-682 | 6.8K | 1/6W | CARBON | |
| | R524 | QRD161J-682 | 6.8K | 1/6W | CARBON | |
| | R525 | QRD161J-152 | 1.5K | 1/6W | CARBON | |
| | R526 | QRD161J-152 | 1.5K | 1/6W | CARBON | |
| | R527 | QRD161J-331 | 330 | 1/6W | CARBON | |
| | R528 | QRD161J-331 | 330 | 1/6W | CARBON | |
| | R529 | QRD161J-474 | 470K | 1/6W | CARBON | |
| | R530 | QRD161J-474 | 470K | 1/6W | CARBON | |
| | R531 | QRD161J-152 | 1.5K | 1/6W | CARBON | |
| | R532 | QRD161J-152 | 1.5K | 1/6W | CARBON | |
| | R533 | QRD161J-472 | 4.7K | 1/6W | CARBON | |
| | R534 | QRD161J-472 | 4.7K | 1/6W | CARBON | |
| | R535 | QRD161J-272 | 2.7K | 1/6W | CARBON | |
| | R536 | QRD161J-272 | 2.7K | 1/6W | CARBON | |
| | R537 | QRD161J-272 | 2.7K | 1/6W | CARBON | |
| | R538 | QRD161J-272 | 2.7K | 1/6W | CARBON | |
| | R539 | QRD161J-561 | 560 | 1/6W | CARBON | |
| | R540 | QRD161J-561 | 560 | 1/6W | CARBON | |
| | R541 | QRD161J-273 | 27K | 1/6W | CARBON | |
| | R542 | QRD161J-273 | 27K | 1/6W | CARBON | |
| | R543 | QRD161J-101 | 100 | 1/6W | CARBON | |
| | R544 | QRD161J-101 | 100 | 1/6W | CARBON | |
| | R545 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R546 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R549 | QRD161J-473 | 47K | 1/6W | CARBON | |
| | R550 | QRD161J-473 | 47K | 1/6W | CARBON | |
| | R553 | QRD161J-473 | 47K | 1/6W | CARBON | |
| | R554 | QRD161J-473 | 47K | 1/6W | CARBON | |
| | R557 | QRD161J-680 | 68 | 1/6W | CARBON | |
| | R558 | QRD161J-680 | 68 | 1/6W | CARBON | |
| | R559 | QRD161J-390 | 39 | 1/6W | CARBON | |
| | R560 | QRD161J-390 | 39 | 1/6W | CARBON | |
| | R561 | QRD161J-471 | 470 | 1/6W | CARBON | |
| | R562 | QRD161J-471 | 470 | 1/6W | CARBON | |
| | R563 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R564 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R602 | QRD161J-123 | 12K | 1/6W | CARBON | |
| | R604 | QRD161J-181 | 180 | 1/6W | CARBON | |
| | R605 | QRD161J-182 | 1.8K | 1/6W | CARBON | |
| | R606 | QRD161J-562 | 5.6K | 1/6W | CARBON | |
| | R607 | QRV144F-3302 | 33 | 1/4W | M.FILM | |
| | R608 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R609 | QRV144F-3302 | 33 | 1/4W | M.FILM | |
| | R610 | QRD161J-271 | 270 | 1/6W | CARBON | |
| | R611 | QRD161J-182 | 1.8K | 1/6W | CARBON | |
| | R612 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R613 | QRD161J-471 | 470 | 1/6W | CARBON | |
| | R614 | QRD161J-104 | 100K | 1/6W | CARBON | |
| | R615 | QRD161J-562 | 5.6K | 1/6W | CARBON | |
| | R616 | QRD161J-182 | 1.8K | 1/6W | CARBON | |
| | R617 | QRD161J-821 | 820 | 1/6W | CARBON | |
| | R618 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R801 | QRD161J-471 | 470 | 1/6W | CARBON | |
| | R802 | QRD161J-472 | 4.7K | 1/6W | CARBON | |
| | R803 | QRD161J-184 | 180K | 1/6W | CARBON | |
| | R804 | QRD161J-562 | 5.6K | 1/6W | CARBON | |
| | R805 | QRD161J-473 | 47K | 1/6W | CARBON | |
| | R806 | QRD161J-101 | 100 | 1/6W | CARBON | |
| | R807 | QRD161J-104 | 100K | 1/6W | CARBON | |
| | R809 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R810 | QRD161J-562 | 5.6K | 1/6W | CARBON | |
| | R811 | QRD161J-562 | 5.6K | 1/6W | CARBON | |
| | R812 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R813 | QRD161J-272 | 2.7K | 1/6W | CARBON | |
| | R814 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R815 | QRD161J-271 | 270 | 1/6W | CARBON | |
| | R816 | QRD161J-562 | 5.6K | 1/6W | CARBON | |

⚠ : SAFETY PARTS

## RESISTORS

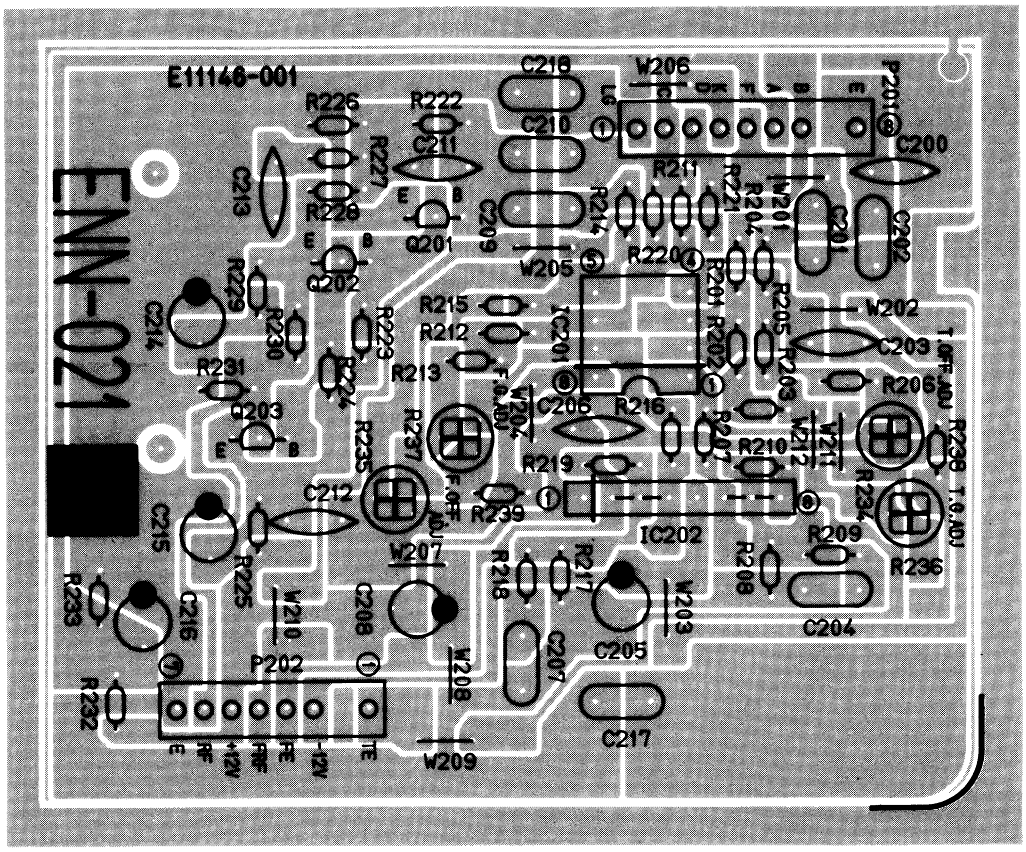
| ⚠ | ITEM | PART NUMBER | DESCRIPTION | | | AREA |
|---|---|---|---|---|---|---|
| | R817 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R818 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R819 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R820 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R821 | QRB045J-472 | 4.7K | 4W | R.NETWORK | |
| | R901 | QRD161J-2R7 | 2.7 | 1/6W | CARBON | |
| | R902 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R903 | QRD161J-125 | 1.2M | 1/6W | CARBON | |
| | R904 | QRD161J-155 | 1.5M | 1/6W | CARBON | |
| | R905 | QRD161J-224 | 220K | 1/6W | CARBON | |
| | R906 | QRD161J-470 | 47 | 1/6W | CARBON | |
| | R907 | QRD161J-124 | 120K | 1/6W | CARBON | |
| | R910 | QRD161J-124 | 120K | 1/6W | CARBON | |
| | R911 | QRD161J-123 | 12K | 1/6W | CARBON | |
| | R912 | QRD161J-182 | 1.8K | 1/6W | CARBON | |
| | R913 | QRD161J-182 | 1.8K | 1/6W | CARBON | |
| | R931 | QRD161J-124 | 120K | 1/6W | CARBON | |
| | R932 | QRD161J-124 | 120K | 1/6W | CARBON | |
| | R933 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R934 | QRD161J-124 | 120K | 1/6W | CARBON | |
| | R935 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R936 | QRD161J-182 | 1.8K | 1/6W | CARBON | |
| | R937 | QRD161J-821 | 820 | 1/6W | CARBON | |
| | R938 | QRD161J-470 | 47 | 1/6W | CARBON | |
| | R939 | QRD161J-103 | 10K | 1/6W | CARBON | |
| | R961 | QRD161J-470 | 47 | 1/6W | CARBON | |
| | R962 | QRD161J-104 | 100K | 1/6W | CARBON | |
| | R963 | QRD161J-104 | 100K | 1/6W | CARBON | |
| | R964 | QRD161J-563 | 56K | 1/6W | CARBON | |
| | R965 | QRD161J-563 | 56K | 1/6W | CARBON | |

## OTHERS

| ⚠ | ITEM | PART NUMBER | DESCRIPTION | AREA |
|---|---|---|---|---|
| | | EWT011-091 | TERMINAL WIRE | |
| | | E11145-103 | CIRCUIT BOARD | |
| | | E72573-001 | FELT SPACER | |
| | | QMS6302-128 | JACK ASSY | |
| | L601 | ENZ3001-002 | OSC.COIL | |
| | P101 | QMV5005-007K | PULAG ASSY | |
| | P102 | QMV5005-006K | PULAG ASSY | |
| | P153 | QMV5005-004K | PULAG ASSY | |
| | P155 | QMV5005-002K | PULAG ASSY | |
| | P158 | QMV5005-002K | PULAG ASSY | |
| | P159 | QMV5005-002K | PULAG ASSY | |
| | P401 | E67764-003 | TERMINAL | |
| | P402 | E67764-006 | TERMINAL | |
| | P501 | QMS3533-001 | JACK ASSY | |
| | P502 | EMN00TV-201A | PIN JACK ASSY | |
| | P901 | QMV5005-006K | PULAG ASSY | |
| | P951 | QMV5005-003K | PULAG ASSY | |
| | CP401 | ICP-F20 | I.C. PROTECTOR | |
| | CP402 | ICP-F20 | I.C. PROTECTOR | |
| | FL301 | ELU0001-025 | F.L.TUBE | |
| | OS501 | ECX0086-436EC | CRYSTAL | |
| | P 301 | QMV5004-005K | PULAG ASSY | |
| | SW304 | ESP0001-008 | PUSH SWITCH | |
| | SW305 | ESP0001-008 | PUSH SWITCH | |
| | SW306 | ESP0001-008 | PUSH SWITCH | |
| | SW307 | ESP0001-008 | PUSH SWITCH | |
| | SW308 | ESP0001-008 | PUSH SWITCH | |
| | SW309 | ESP0001-008 | PUSH SWITCH | |
| | SW310 | ESP0001-008 | PUSH SWITCH | |
| | SW311 | ESP0001-008 | PUSH SWITCH | |
| | SW312 | ESP0001-008 | PUSH SWITCH | |
| | SW313 | ESP0001-008 | PUSH SWITCH | |
| | L550 | ENZ8101-003 | FERRITE BEADS | G |

⚠ : SAFETY PARTS

## 4-(2) ENN-021A RF P. C. Board Ass'y


E11146-001
ENN-021
R226
R222
C218
W206
P201
C210
C211
C200
R227
R228
C213
Q201
C209
R211
R214
R221
R204
W201
C201
C202
Q202
W205
R220
R201
R202
R205
R203
W202
C203
T.OFF ADJ
R229
C214
R230
R223
R215
R212
R213
IC201
F.O.ADJ
R206
R231
R224
Q203
R237
W204
C206
R216
R207
W212
W211
R210
R238
R235
R234
T.O.ADJ
C212
F.OFF ADJ
R219
R239
IC202
C215
R209
R236
R225
W207
R218
R217
R208
R233
C216
W210
C208
W203
C205
C204
P202
W208
C207
R232
C217
W209
E
RF
+12V
FE
-12V
TE

TRANSITORS

| ⚠ | ITEM | PART NUMBER | DESCRIPTION | | AREA |
|---|---|---|---|---|---|
| | | | | MAKER | |
| | Q201 | 2SC535(B,C) | SILICON | HITACHI | |
| | Q202 | 2SC458(C,D) | SILICON | HITACHI | |
| | Q203 | 2SA1029(C,D) | SILICON | HITACHI | |

I. C. S

| ⚠ | ITEM | PART NUMBER | DESCRIPTION | | AREA |
|---|---|---|---|---|---|
| | | | | MAKER | |
| | IC201 | NJM072D | I.C. | JRC | |

CAPACITORS

| ⚠ | ITEM | PART NUMBER | DESCRIPTION | | | AREA |
|---|---|---|---|---|---|---|
| | C201 | QFP81HG-431 | 430PF | 50V | POLY | |
| | C202 | QFP81HG-471 | 470PF | 50V | POLY | |
| | C203 | QCC21EM-473 | 0.047MF | 25V | CERAMIC | |
| | C205 | QETB1CM-226 | 22MF | 16V | ELECTRO | |
| | C206 | QCC21EM-473 | 0.047MF | 25V | CERAMIC | |
| | C208 | QETB1CM-226 | 22MF | 16V | ELECTRO | |
| | C209 | QFN81HJ-562 | 5600PF | 50V | MYLAR | |
| | C210 | QFN81HJ-562 | 5600PF | 50V | MYLAR | |
| | C211 | QCS21HJ-3R0 | 3.0PF | 50V | CERAMIC | |
| | C212 | QCC21EM-473 | 0.047MF | 25V | CERAMIC | |
| | C213 | QCS21HJ-271 | 270PF | 50V | CERAMIC | |
| | C214 | QETB1EM-106 | 10MF | 25V | ELECTRO | |
| | C215 | QETB1CM-476 | 47MF | 16V | ELECTRO | |
| | C216 | QETB1CM-476 | 47MF | 16V | ELECTRO | |
| | C217 | QFV81HJ-104 | 0.1MF | 50V | T.FILM | |
| | C218 | QFV81HJ-104 | 0.1MF | 50V | T.FILM | |

RESISTORS

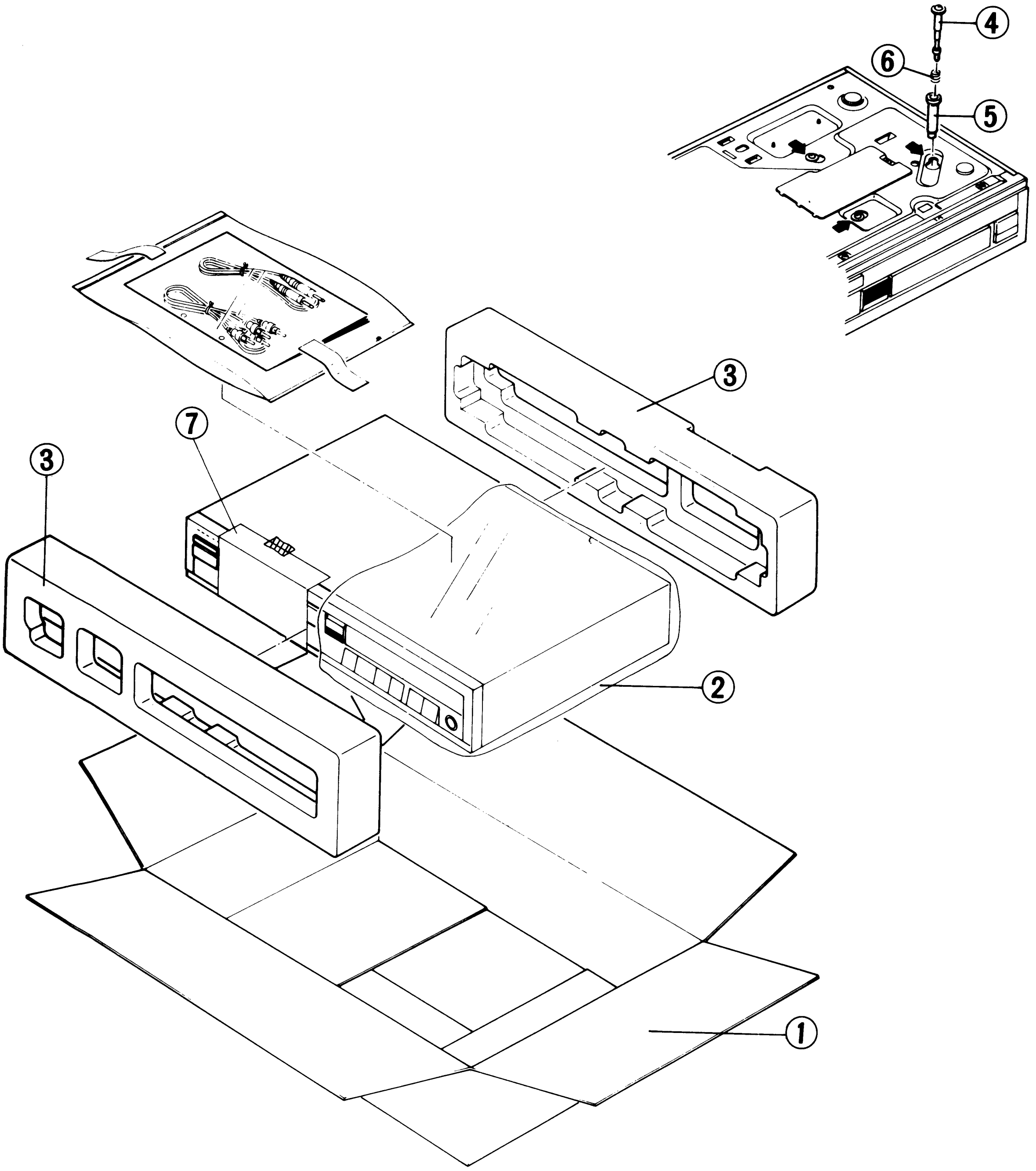
| ⚠ | ITEM | PART NUMBER | DESCRIPTION | | | AREA |
|---|---|---|---|---|---|---|
| | R201 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R202 | QRV144F-3603 | 36 | 1/4W | M.FILM | |
| | R203 | QRV144F-4703 | 47 | 1/4W | M.FILM | |
| | R204 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R205 | QRV144F-3603 | 36 | 1/4W | M.FILM | |
| | R206 | QRV144F-3603 | 36 | 1/4W | M.FILM | |
| | R211 | QRD161J-392 | 3.9K | 1/6W | CARBON | |
| | R212 | QRV144F-4703 | 47 | 1/4W | M.FILM | |
| | R214 | QRD161J-392 | 3.9K | 1/6W | CARBON | |
| | R215 | QRV144F-3603 | 36 | 1/4W | M.FILM | |
| | R220 | QRD161J-105 | 1M | 1/6W | CARBON | |
| | R221 | QRD161J-105 | 1M | 1/6W | CARBON | |
| | R222 | QRD161J-392 | 3.9K | 1/6W | CARBON | |
| | R223 | QRD161J-183 | 18K | 1/6W | CARBON | |
| | R224 | QRD161J-561 | 560 | 1/6W | CARBON | |
| | R225 | QRD161J-271 | 270 | 1/6W | CARBON | |
| | R226 | QRD161J-391 | 390 | 1/6W | CARBON | |
| | R227 | QRD161J-271 | 270 | 1/6W | CARBON | |
| | R228 | QRD161J-152 | 1.5K | 1/6W | CARBON | |
| | R229 | QRD161J-561 | 560 | 1/6W | CARBON | |
| | R230 | QRD161J-562 | 5.6K | 1/6W | CARBON | |
| | R231 | QRD161J-152 | 1.5K | 1/6W | CARBON | |
| | R232 | QRD161J-272 | 2.7K | 1/6W | CARBON | |
| | R234 | QVZ3513-224 | | | VARIABLE | |
| | R235 | QVZ3513-224 | | | VARIABLE | |
| | R236 | QVZ3513-222 | | | VARIABLE | |
| | R238 | QRD161J-182 | 1.8K | 1/6W | CARBON | |

OTHERS

| ⚠ | ITEM | PART NUMBER | DESCRIPTION | AREA |
|---|---|---|---|---|
| | | EWT042-017 | TERMINAL WIRE | |
| | | E11146-001 | CIRCUIT BOARD | |

⚠ : SAFETY PARTS

# 5. Packing Materials and Part Numbers



| ⚠ | No. | Part Number | Part Name | Q'ty | Description | Areas |
|---|---|---|---|---|---|---|
| | 1 | PK-XLV200BE | Packing Case | 1 | E24872-010 | Except ES |
| | | PK-XLV200BEES | Packing Case | 1 | E24872-011 | ES only |
| | 2 | E300196-063 | Envelope | 1 | | Except BS |
| | | E300196-063B | Envelope | 1 | | BS only |
| | 3 | NZ-XLV200 | Packing Pad | 1 | Front:E11197-001<br>Rear:E11197-002 | |
| | 4 | E72395-001 | Screw | 3 | | |
| | 5 | E72394-001 | Spacer | 3 | | |
| | 6 | E72396-001 | Comp. Spring | 3 | | |
| | 7 | E303871-006 | Caution Sheet | 1 | Before Use | |

⚠ : Safety Parts

# 6. Accessories List

| ⚠ | Part Number | Part Name | Description | Areas |
|---|---|---|---|---|
| | E30580-1265B | Instruction Book | | Except BS |
| | E30580-1265BBS | Instruction Book | | BS only |
| | BT20047C | Warranty Card | | J, P, PG |
| | BT20025H | Warranty Card | | C |
| | BT20029C | Warranty Card | | A |
| | BT20060 | Warranty Card | | BS |
| | BT20064 | Warranty Card | | G |
| | BT20044E | Safety Instruction Book | | J |
| | BT20046B | Service Information Card | | J, P, PG |
| | BT20071A | SVC Center List | | C |
| | BT20066 | EEC Agency | | BS, G |
| | E70570-001 | Keeping Card (1) | for Laser | J |
| | E70571-001 | Keeping Card (2) | for Laser | J |
| | E70572-001 | Keeping Card (3) | for Laser | J |
| | A76332-2 | Keeping Card | | J |
| | E35497-017 | Caution Sheet | for Line Voltage (110 V) | P |
| | E35497-019 | Caution Sheet | for Line Voltage (220 V) | U, PG |
| ⚠ | E04056 | Siemens Plug | | U, PG |
| | EWP302-101 | Signal Cord | | |
| | EWP805-001 | 1P Plug Cord Ass'y | | |
| | E66416-003 | Envelope | for Warranty Card | J |
| | E300196-010 | Envelope | for Instruction Book | Except BS |
| | E300196-010B | Envelope | for Instruction Book | BS only |

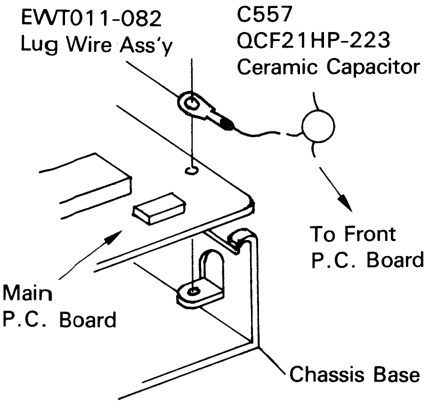
⚠ : Safety Parts

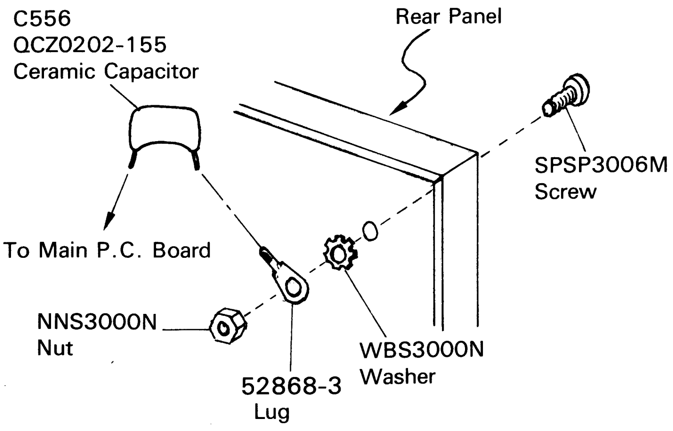
**The Marks for Designated Area**

J . . . . . . . . U.S.A.
C . . . . . . . . Canada
A . . . . . . . . Australia
E . . . . . . . . Europe
G . . . . . . . . West Germany
ES . . . . . . . Spain
BS . . . . . . . U.K.
P, PG . . . . . U.S. Military Market
U . . . . . . . . Other Countries

No mark indicates all areas.

# 7. Additional Parts for West Germany


EWT011-082
Lug Wire Ass'y
C557
QCF21HP-223
Ceramic Capacitor
To Front
P.C. Board
Main
P.C. Board
Chassis Base


C556
QCZ0202-155
Ceramic Capacitor
Rear Panel
SPSP3006M
Screw
To Main P.C. Board
NNS3000N
Nut
52868-3
Lug
WBS3000N
Washer